Reference Room

COLORADO RIVER STORAGE PROJECT

HEARINGS

BEFORE THE

SUBCOMMITTEE ON IRRIGATION AND RECLAMATION

OF THE

COMMITTEE ON INTERIOR AND INSULAR AFFAIRS UNITED STATES SENATE

EIGHTY-FOURTH CONGRESS

FIRST SESSION

ON

S. 500

A BILL TO AUTHORIZE THE SECRETARY OF THE INTERIOR TO CONSTRUCT, OPERATE, AND MAINTAIN THE COLORADO RIVER STORAGE PROJECT AND PARTICIPATING PROJECTS, AND FOR OTHER PURPOSES

FEBRUARY 28, MARCH 1, 2, 3, 4, AND 5, 1955

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COLORADO RIVER STORAGE PROJECT

MONDAY, FEBRUARY 28, 1955

UNITED STATES SENATE,
SUBCOMMITTEE ON IRRIGATION AND RECLAMATION
OF THE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS,
Washington, D. C.

The subcommittee met at 10 a. m., pursuant to call, in room 318, Senate Office Building, Senator Clinton P. Anderson presiding.

Present: Senators Clinton P. Anderson (chairman of the subcommittee); Joseph C. O'Mahoney, Wyoming; Eugene D. Millikin, Colorado; Arthur V. Watkins, Utah.

Present also: Senators James E. Murray, Montana (chairman of the full committee); W. Kerr Scott, North Carolina; Alan Bible, Nevada; Thomas H. Kuchel, California; Frank A. Barrett, Wyoming; Barry Goldwater, Arizona; Gordon Allott, Colorado; Representative at Large Keith Thomson, Wyoming.

Present also: Stewart French, staff director and chief counsel; Goodrich W. Lineweaver, staff member for reclamation; William K. Coburn, staff member for public lands; James Gamble, staff member for Indian affairs; Richard L. Callaghan, chief clerk; N. D. McSherry, assistant chief clerk.

Senator ANDERSON. The committee will come to order, please.

I am very happy to see so many people here today. I am sure they are interested in this project for the upper Colorado Basin. I want to make a very short statement in order that there may be complete understanding as to the scope of this hearing.

On June 28, 29, 30, July 1, 2, and 3 of last year, this committee held comprehensive hearings on S. 1555 under the chairmanship of Senator Eugene Millikin of Colorado. I thought they were very thorough and careful hearings. The printed hearings contain 690 pages of testimony, resolutions, and other evidence. I think it is generally agreed that every opportunity was afforded all interested parties to express their particular point of view on that proposed legislation.

The bill which is now before us, S. 500, is identical with Senate 1555 as reported to the Senate in 1954. Within the past month we have been attempting to notify those who appeared last year of this new hearing and tried to make it clear in press release as well as individual letters that we are interested in receiving pertinent supplemental information and new suggestions.

In the intervening months since July there have been new developments which should be helpful to the committee in its consideration of S. 500. We want to incorporate the new material to supplement the hearings of 1954. However, in the interest of economy and with an eye to eliminating repetitious testimony, I hope that the witnesses confine their remarks to the new material as far as possible.

A tentative list of witnesses has been made up, and every possible consideration has been given to the order in which the witnesses desire to appear. We are not going to cut people off. We do want everyone to have a chance to testify who has pertinent information. Those who plan to testify should check their appearance with the committee staff so that we can proceed as expeditiously as possible. If the schedule is adhered to, we should conclude on Wednesday. I have no hope that we will succeed in doing that, but if we could conclude on Thursday, then we will be very happy indeed.

Senator KUCHEL. Mr. Chairman, may I ask a question?

Senator ANDERSON. Yes, indeed.

Senator KUCHEL. I am not a member of your subcommittee.

Senator ANDERSON. Nobody has offered to throw you out as yet, and as long as you behave reasonably well, we are happy to welcome you and Senator Goldwater and everybody else.

Senator KUCHEL. I appreciate the graciousness of your comments, and I would like if the Chair would permit it to have an opportunity to raise questions with respect to the witnesses.

Senator ANDERSON. We are happy to have you here. You go right ahead and ask questions. We only try to keep the committee small for the purpose of expediting its work. We do not intend to bar points of view by keeping it small. We regard Senator Goldwater and you as important members of the committee, and Senator Bible and the chairman of the committee himself, Senator Murray.

The Joint Committee on Atomic Energy is required by law to conduct certain hearings in the first 60 days of the congressional session. It may be that if we run into afternoon sessions, I would have to be excused, and ask some other member of the committee to proceed with the hearings. But I will be here whenever possible. My colleague, Senator Chavez, has an important committee meeting this morning. I ask the indulgence of the committee to accommodate him and have his statement at this time.

STATEMENT OF HON. DENNIS CHAVEZ, UNITED STATES SENATOR FROM THE STATE OF NEW MEXICO

Senator CHAVEZ. Thank you very much, Mr. Chairman. I want to thank the chairman and the members of the committee for allowing me to appear before you. As stated by the chairman, hearings were held by the committee last session on Senate bill 1555. Today you are having hearings on Senate bill 500. May I say that for the purposes of both bills, I am for them 100 percent. I do not know what the committee will do eventually, but we of the upper basin States are deeply interested in the proposed legislation. In order to save the time of the committee, I have a prepared statement that I would like to read for the record, so that the committee may know just what my views are in this respect:

The subcommittee is today holding hearings again on a project which was considered by the 83d Congress, 2d session. The bill on this was S. 1555. Today we are holding hearings on a new bill, S. 500. As pointed out by by me last year (please refer to p. 248 of the document titled "Colorado River Storage Project" which contains the hearings before this committee), the idea of the development of projects to put Colorado River water to use in the upper basin has been

considered for at least 30 years. The specific projects in New Mexico referred to in S. 500 are, first, the Navaho Dam, which is included as one of the initial units of the Colorado River storage plan and, second, participating projects, which include the small Hammond project, which comprises 3,700 acres, and the Pine River extension which is principally in Colorado and includes a small area in New Mexico. The bill also provides for authorization on a provisional basis the Navaho project and the San Juan-Chama project as participating projects. The provision is that no appropriation for construction of these projects shall be made until coordinated reports have been submitted in accordance with the Flood Control Act of 1944.

During the hearings last year arguments were raised concerning the unofficial plans of the Bureau of Reclamation for the construction of the San Juan-Chama project which proposed power dams on the Rio Chama. Because of the objections of the New Mexico people below Elephant Butte Dam and our friends in Texas, plans have now been modified so that storage facilities for water imported to the Rio Grande by the San Juan-Chama project would be limited to a single offstream dam and reservoir on a tributary of the Rio Chama, and it would be used only for the control and regulation of the water imported from the San Juan Basin, and no power facilities would be constructed.

I understand that this reservoir would be on Willow Creek, which is a small tributary of the Chama, and the capacity would be limited to about 400,000 acre-feet. The plans have been modified to conform to those which seem compatible to all interests. I also want to see that any operation of the San Juan-Chama project will not interfere with deliveries of water to present users in the Rio Grande Basin nor to present users within the San Juan Basin.

During the hearings last year, it was stated by representatives of the Bureau of Reclamation and the Bureau of Indian Affairs that feasibility reports were being prepared. New Mexico has always felt that the reports on the two projects should be submitted together. I understand that field drafts of reports have been completed on both the Navaho project and the San Juan-Chama project. I also understand that the plans have been discussed with many of our people in New Mexico and I am certain that we have full agreement within the State of New Mexico on the manner in which we would use our small share of the upper Colorado River water.

As you probably know, there are about 13,000 families living on the Navaho reservations and on Indian allotments in the States of New Mexico and Arizona. At the present time almost 9,000 of these families are trying to eke out an existence on an area which can barely support 2,400 families on a minimum subsistence level. The poverty of these people is a disgrace to our country and the responsibility of the United States to take care of these people should certainly be recognized. We are perfectly willing to help undeveloped areas in the world, but we do not seem to get around to taking care of our own citizens.

At this point I would like to tell you a little about the Navaho project. This project, which is made up of two areas, the Shiprock division and the South San Juan division, would receive water from the Navaho Dam and Reservoir. The total area in this project is about

137,000 acres and would provide farm units for about 1,400 Indian and non-Indian families. An additional 2,800 families would receive their support indirectly from the Navaho project. Thus, 4,200 families would receive support from the project. These lands are almost totally undeveloped and with the limited rainfall the area supports only sparse vegetation. Now there are only about 130 Navaho families living in this area.

I would like to digress a little and tell you that New Mexico has a background of four centuries under Indian, Spanish, Mexican, and American cultures, and we need to take only a hurried glance to see what happened in those times. First it was the search for gold—the Spaniards who were seeking the gold found that Pubelo Indians in the Rio Grande Valley were using irrigation. Work on the first Spanish irrigation system was begun in about 1598.

Despite these early beginnings of agricultural development by the Spanish settlers for 3½ centuries, mining development took precedence over agricultural development in New Mexico. Settlers gave early recognition to that wealth that could only be released by irrigation of the barren wasteland. Efforts have been made by individuals and irrigation districts to develop these lands and as a result many acres of land have been put under cultivation, under irrigation.

The entry of the Federal Government into the field of water-resources development was of tremendous importance to New Mexico because the projects needed would cost more than the local people could finance. Out of this Federal participation we have such projects in the State as Elephant Butte Irrigation District in south central New Mexico, Carlsbad project in Eddy County, the Tucumcari project in the eastern part of the State, the Vermejo project in Colfax County, and the Fort Sumner project near Fort Sumner, N. Mex. Recently the Federal Government has taken steps to assist the Middle Rio Grande Conservancy District, a private enterprise. This project is known as the middle Rio Grande project. However, other areas are not so fortunate.

I have had many requests for assistance in their irrigations problems from people in the upper Rio Grande Basin in New Mexico, where we have a rural white population in excess of 40,000 and more than 10,000 Indians. This concentration of population obtains its livelihood largely from the small scattered inadequately irrigated lands along the streams. The farms average less than 10 acres of land. This means that the people in these areas are living on a bare subsistence basis. The land resources of the upper Rio Grande area are subject to destructive use as pointed out in the President's water resources policy report of 1950. This report states:

> The Rio Grande Valley is one of the oldest continuously settled regions in the United States. The limited water resources have been developed and used for centuries. All water has been appropriated and in some cases overappropriated. Water used for any purpose can be expanded only at the expense of some other use.

I have also had many requests for assistance from the people of the adjacent upper Canadian Basin.

The Rio Grande Basin in New Mexico has about 400,000 of the State's total population of about 780,000. Cities like Albuquerque have had tremendous growth and new cities like Los Alamos have been

built. These cities as well as other cities use much water. The only solution is more water.

The San Juan-Chama project plan would provide a supplemental water supply for some 40,000 acres out of a total of about 75,000 acres in the upper reaches of the Rio Grande. It would provide a supplemental supply of water to about 24,000 acres of lands in the upper Canadian Basin; it would provide a supplemental water supply to about 180,000 acres of land along the Rio Grande from Espanola to the Texas-New Mexico State line; and it would provide a municipal and industrial water supply for cities such as Los Alamos and Albuquerque where we have large atomic energy and defense installations.

The project would also provide a domestic supply of water for the many Indians as well as whites living within the Rio Grande and upper Canadian Basins. It would enable the people living on many of the small irrigated farms to receive a full water supply for their small farms, thereby improving their standards of living. In producing more feed for their livestock on irrigated farms, it would relieve the overgrazed condition of the pasturelands which is recognized as one of the principal causes of erosion.

There are many more things that I could say about the need for constructing the Navaho and San Juan-Chama projects, but I do not wish to take up any more of your time. The upper Colorado project is vitally important to the upper Colorado Basin States, and I will lend my full support to its authorization, and I strongly urge you to include the two small projects, Hammond and Pine River extension, as well as the much-needed Navaho and San Juan-Chama projects.

Senator ANDERSON. Are there any other Members of the Senate that desire to make statements before we start our regular program?

Senator Millikin, I regret to say, is detained for a short time. We all appreciate the very wonderful work which he did in the preparation of the hearings 7 or 8 months ago and the very fine work which he did in working out an acceptable bill to be reported to the floor. I am sure he will be with us shortly again, and we will have the benefit of his advice and counsel.

Without objections at this point, I will put in the record a copy of Senate bill 500, introduced on January 18.

(Senate bill 500 is as follows:)

[S. 500, 84th Cong., 1st sess.]

A BILL To authorize the Secretary of the Interior to construct, operate, and maintain the Colorado River storage project and participating projects, and for other purposes

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That, in order to initiate the comprehensive development of the water resources of the Upper Colorado River Basin, the Congress, in the exercise of its constitutional authority to provide for the general welfare, to regulate commerce among the States and with the Indian tribes, and to make all needful rules and regulations respecting property belonging to the United States, and for the purposes, among others, of regulating the flow of the Colorado River, storing water for beneficial consumptive use, making it possible for the States of the Upper Basin to utilize, consistently with the provisions of the Colorado River Compact, the apportionments made to and among them in the Colorado River Compact and the Upper Colorado River Basin Compact, respectively, providing for the reclamation of arid and semiarid land, for the control of floods and for the improvement of navigation, and the generation of hydroelectric power, as an incident of the foregoing purposes, hereby authorizes the Secretary of the Interior (1) to construct, operate, and maintain the following initial units of the Colorado River storage project, consisting of dams,

reservoirs, powerplants, transmission facilities and appurtenant works: Cross Mountain, Curecanti, Echo Park, Flaming Gorge, Glen Canyon, and Navajo: *Provided*, That the Curecanti Dam shall be constructed to a height which will impound not less than nine hundred and forty thousand acre-feet of water or will create a reservoir of such greater capacity as can be obtained by a high waterline located at seven thousand five hundred and twenty feet above mean sea level and that construction thereof shall not be undertaken until the Secretary has, on the basis of further engineering and economic investigations, reexamined the economic justification of such unit and, accompanied by appropriate documentation in the form of a supplemental report, has certified to the Congress and to the President that, in his judgment, the benefits of such unit will exceed its costs; and (2) to construct, operate, and maintain the following additional reclamation projects (including power-generating and transmission facilities related thereto), hereinafter referred to as participating projects: Central Utah (initial phase); Emery County, Florida, Gooseberry, Hammond, La Barge, Lyman, Paonia (including the Minnesota unit, a dam and reservoir on Muddy Creek just above its confluence with the North Fork of the Gunnison River, and other necessary works), Pine River Extension, Seedskadee, Silt, Smith Fork, San Juan-Chama, Navajo: *Provided*, That (a) construction of the participating projects set forth in this clause (2) shall not be undertaken until the Secretary has reexamined the economic justification of such project and, accompanied by appropriate documentation in the form of a supplemental report, has certified to the Congress, through the President, that, in his judgment, the benefits of such project will exceed its costs, and that the financial reimbursability requirements set forth in section 4 of this Act can be met. The Secretary's supplemental report for each such project shall include, among other things, (i) a reappraisal of the prospective direct agricultural benefits of the project made by the Secretary after consultation with the Secretary of Agriculture; (ii) a reevaluation of the nondirect benefits of the project; and (iii) allocations of the total cost of construction of each participating project or separable features thereof, excluding any expenditures authorized by section 7 of this Act, to power, irrigation, municipal water supply, flood control or navigation, or any other purpose authorized under reclamation law. Section 1 (c) of the Flood Control Act of 1944 shall, except as hereinafter provided for the San Juan-Chama and the Navajo participating projects, not be applicable to such supplemental reports; and, (b) that no appropriation for or construction of the San Juan-Chama project or the Navajo participating project shall be made or begun until coordinated reports thereon shall have been submitted to the affected States, including (but without limiting the generality of the foregoing) the State of Texas, pursuant to the Act of December 22, 1944, and said projects shall have been approved and authorized by the Congress: *Provided further*, That with reference to the San Juan-Chama project, it shall be limited to a single offstream dam and reservoir on a tributary of the Chama River to be used solely for the control and regulation of water imported from the San Juan River, that no power facilities shall be established, installed, or operated along the diversion or on the reservoir or dam, and such dam and reservoir shall at all times be operated by the Bureau of Reclamation of the Department of the Interior in strict compliance with the Rio Grande Compact as administered by the Rio Grande Compact Commission.

SEC. 2. In order to achieve such comprehensive development as will assure the consumptive use in the States of the Upper Colorado River Basin of waters of the Colorado River system the use of which is apportioned to the Upper Colorado River Basin by the Colorado River Compact and to each State thereof by the Upper Colorado River Basin Compact, it is the intent of the Congress in the future to authorize the construction, operation, and maintenance of further units of the Colorado River storage project, of additional phases of participating projects authorized in this Act, and of new participating projects as additional information becomes available and additional needs are indicated. It is hereby declared to be the purpose of the Congress to authorize as participating projects only projects (including units or phases thereof)—

(1) for the use, in one or more of the States designated in article III of the Upper Colorado River Basin Compact, of waters of the Upper Colorado River system the consumptive use of which is apportioned to those States by that article; and

(2) for which pertinent data sufficient to determine their probable engineering and economic justification and feasibility shall be available. It is likewise declared to be the policy of the Congress that the costs of any par-

ticipating project authorized in the future shall be amortized from its own revenues to the fullest extent consistent with the provisions of this Act and Federal reclamation law.

SEC. 3. Except as otherwise provided in this Act, in constructing, operating, and maintaining the units of the Colorado River storage project and the participating projects listed in section 1 of this Act, the Secretary shall be governed by the Federal reclamation laws (Act of June 17, 1902, 32 Stat. 388, and Acts amendatory thereof or supplementary thereto): *Provided*, That (a) irrigation repayment contracts shall be entered into which, except as otherwise provided for the Paonia and Eden projects, provide for repayment of the obligation assumed thereunder with respect to any project contract unit over a period of not more than fifty years exclusive of any development period authorized by law; (b) prior to construction of irrigation distribution facilities, repayment contracts shall be made with an "organization" as defined in paragraph 2 (g) of the Reclamation Project Act of 1939 (53 Stat. 1187) which has the capacity to levy assessments upon all taxable real property located within its boundaries to assist in making repayments, except where a substantial proportion of the lands to be served are owned by the United States; (c) contracts relating to municipal water supply may be made without regard to the limitations of the last sentence of section 9 (c) of the Reclamation Project Act of 1939; and (d), as to Indian lands within, under, or served by any participating project, payment of construction costs within the capability of the land to repay shall be subject to the Act of July 1, 1932 (47 Stat. 564). All units and participating projects shall be subject to the apportionments of the use of water between the Upper and Lower Basins of the Colorado River and among the States of the Upper Basin fixed in the Colorado River Compact and the Upper Colorado River Basin Compact, respectively, and to the terms of the treaty with the United Mexican States (Treaty Series 994).

SEC. 4. (a) There is hereby authorized a separate fund in the Treasury of the United States to be known as the Upper Colorado River Basin Fund (hereinafter referred to as the Basin Fund), which shall remain available until expended, as hereafter provided, for carrying out provisions of this Act other than section 7.

(b) All appropriations made for the purpose of carrying out the provisions of this Act, other than section 7, shall be credited to the Basin Fund as advances from the general fund of the Treasury.

(c) All revenues collected in connection with the operation of the Colorado River storage project and participating projects shall be credited to the Basin Fund, and shall be available, without further appropriation, for (1) defraying the costs of operation, maintenance, and replacements of, and emergency expenditures for, all facilities of the Colorado River storage project and participating projects, within such separate limitations as may be included in annual appropriation acts, (2) payment as required by subsection (d) of this section, (3) payment of the reimbursable construction costs of the Paonia project which are beyond the ability of the water users to repay within the period prescribed in the Act of June 25, 1947 (61 Stat. 181), said payment to be made within fifty years after completion of that portion of the project which has not been constructed as of the date of this Act, and (4) payment in connection with the irrigation features of the Eden project as specified in the Act of June 28, 1949 (63 Stat. 277): *Provided*, That revenues credited to the Basin Fund shall not be available for appropriation for construction of the units and participating projects authorized by or pursuant to this Act.

(d) Revenues in the Basin Fund in excess of operating needs shall be paid annually to the general fund of the Treasury to return—

(1) the costs of each unit, participating project, or any separable feature thereof which are allocated to power pursuant to section 5 of this Act, within a period not exceeding fifty years from the date of completion of such unit, participating project, or separable feature thereof;

(2) the costs of each unit, participating project, or any separable feature thereof which are allocated to municipal water supply pursuant to section 5 of this Act, within a period not exceeding fifty years from the date of completion of such unit, participating project, or separable feature thereof;

(3) interest on the unamortized balance of the investment (including interest during construction) in the power and municipal water supply features of each unit, participating project, or any separable feature thereof, at a rate determined by the Secretary of the Treasury as provided in subsection (e), and interest due shall be a first charge; and

(4) the costs of each unit, participating project, or any separable feature thereof which are allocated to irrigation pursuant to section 5 of this Act within a period not exceeding fifty years, in addition to any development period authorized by law, from the date of completion of such unit, participating project of separable feature thereof, or, in the cases of the Paonia project and of Indian lands, within a period consistent with other provisions of law applicable thereto.

(e) The interest rate applicable to each unit of the storage project and each participating project shall be determined by the Secretary of the Treasury as of the time the first advance is made for initiating construction of said unit or project. Such interest rate shall be determined by calculating the average yield to maturity on the basis of daily closing market bit quotations during the month of June next preceding the fiscal year in which said advance is made, on all interest-bearing marketable public debt obligations of the United States having a maturity date of fifteen or more years from the first day of said month, and by adjusting such average annual yield to the nearest one-eighth of 1 per centum.

(f) Business-type budgets shall be submitted to the Congress annually for all operations financed by the Basin Fund.

SEC. 5. Upon completion of each unit, participating project or separable feature thereof the Secretary shall allocate the total costs (excluding any expenditures authorized by section 7 of this Act) of constructing said unit, project or feature to power, irrigation, municipal water supply, flood control, navigation, or any other purposes authorized under reclamation law. Allocations of construction, operation and maintenance costs to authorized nonreimbursable purposes shall be nonreturnable under the provisions of this Act. On January 1 of each year the Secretary shall report to the Congress for the previous fiscal year, beginning with the fiscal year 1955, upon the status of the revenues from and the cost of constructing, operating, and maintaining the Colorado River storage project and the participating projects. The Secretary's report shall be prepared to reflect accurately the Federal investment allocated at that time to power, to irrigation, and to other purposes, the progress of return and repayment thereon, and the estimated rate of progress, year by year, in accomplishing full repayment.

SEC. 6. The hydroelectric powerplants authorized by this Act to be constructed, operated, and maintained by the Secretary shall be operated in conjunction with other Federal powerplants, present and potential, so as to produce the greatest practicable amount of power and energy that can be sold at firm power and energy rates, but no exercise of the authority hereby granted shall affect or interfere with the operation of any provision of the Colorado River Compact, the Upper Colorado River Basin Compact, or the Boulder Canyon Project Act.

SEC. 7. In connection with the development of the Colorado River storage project and of the participating projects, the Secretary is authorized and directed to investigate, plan, construct, operate, and maintain (1) public recreational facilities on lands withdrawn or acquired for the development of said project or of said participating projects, to conserve the scenery, the natural, historic, and archeologic objects, and the wildlife on said lands, and to provide for public use and enjoyment of the same and of the water areas created by these projects by such means as are consistent with the primary purposes of said projects; and (2) facilities to mitigate losses of and improve conditions for the propagation of fish and wildlife. The Secretary is authorized to acquire lands and to withdraw public lands from entry or other disposition under the public land laws necessary for the construction, operation, and maintenance of the facilities herein provided, and to dispose of them to Federal, State, and local governmental agencies by lease, transfer, exchange, or conveyance upon such terms and conditions as will best promote their development and operation in the public interest. All costs incurred pursuant to this section shall be nonreimbursable and nonreturnable.

SEC. 8. Nothing contained in this Act shall be construed to alter, amend, repeal, construe, interpret, modify, or be in conflict with any provision of the Boulder Canyon Project Act (45 Stat. 1057), the Boulder Canyon Project Adjustment Act (54 Stat. 774), the Colorado River Compact, the Upper Colorado River Basin Compact, the Rio Grande Compact of 1938, or the Treaty With the United Mexican States (Treaty Series 994).

SEC. 9. Expenditures for the Cross Mountain, Flaming Gorge, Glen Canyon, Navajo and Echo Park initial units of the Colorado River storage project may be made without regard to the soil survey and land classification requirements of the Interior Department Appropriation Act, 1954.

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SEC. 10. There are hereby authorized to be appropriated such sums as may be required to carry out the purposes of this Act.

SEC. 11. The appropriate agencies of the United States are authorized to convey to the city and county of Denver, Colorado, for use as a part of its municipally owned water system, such interests in lands and water rights used or acquired by the United States solely for the generation of power and other property of the United States as shall be required in connection with the development or use of its Blue River project, upon payment by Denver for any such interest of the value thereof at the time of its acquisition by Denver, and provided that any such transfer shall be so limited as not to preclude the use of the property other than water rights for the necessary functions of the United States Government.

SEC. 12. In the operation and maintenance of all facilities, authorized by Federal law and under the jurisdiction and supervision of the Secretary of the Interior, in the basin of the Colorado River, the Secretary of the Interior is directed to comply with the applicable provisions of the Colorado River Compact, the Boulder Canyon Project Act, the Boulder Canyon Project Adjustment Act, and the Treaty with the United Mexican States, in the storage and release of water from reservoirs in the Colorado River Basin. In the event of the failure of the Secretary of the Interior to so comply, any State of the Colorado River Basin may maintain an action in the Supreme Court of the United States to enforce the provisions of this section, and consent is given to the joinder of the United States as a party in such suit or suits. No right to impound or use water for the generation of power or energy, created or established by the building, operation or use of any of the powerplants authorized by this Act, shall be deemed to have priority over or otherwise operate to preclude or impair any use, regardless of the date of origin of such use, of the waters of the Colorado River and its tributaries for domestic or agricultural purposes within any of the States of the Upper Colorado River Basin.

SEC. 13. As used in this Act—

The terms "Colorado River Basin," "Colorado River Compact," "Colorado River System," "Lee Ferry," "States of the Upper Division," "Upper Basin," and "domestic use" shall have the meaning ascribed to them in article II of the Upper Colorado River Basin Compact;

The term "States of the Upper Colorado River Basin" shall mean the States of Arizona, Colorado, New Mexico, Utah, and Wyoming;

The term "Upper Colorado River Basin" shall have the same meaning as the term "Upper Basin";

The term "Upper Colorado River Basin Compact" shall mean that certain compact executed on October 11, 1948, by commissioners representing the States of Arizona, Colorado, New Mexico, Utah, and Wyoming, and consented to by the Congress of the United States of America by Act of April 6, 1949 (63 Stat. 31);

The term "Rio Grande Compact" shall mean that certain compact executed on March 18, 1938, by commissioners representing the States of Colorado, New Mexico, and Texas and consented to by the Congress of the United States of America by Act of May 31, 1939 (53 Stat. 785); and

The term "treaty with the United Mexican States" shall mean that certain treaty between the United States of America and the United Mexican States signed at Washington, District of Columbia, February 3, 1944, relating to the utilization of the waters of the Colorado River and other rivers, as amended and supplemented by the protocol dated November 14, 1944, and the understandings recited in the Senate resolution of April 18, 1945, advising and consenting to ratification thereof.

Senator ANDERSON. I will also put in the record the report of the Department of the Interior to the chairman of the committee, Senator Murray, dated February 25, 1955.

(The report is as follows:)

DEPARTMENT OF THE INTERIOR,
OFFICE OF THE SECRETARY,
Washington D. C., February 25, 1955.

Hon. JAMES E. MURRAY,
Chairman, Committee on Interior and Insular Affairs,
United States Senate, Washington, D. C.

MY DEAR SENATOR MURRAY: A report has been requested from this Department on S. 500, a bill to authorize the Secretary of the Interior to construct, operate, and maintain the Colorado River storage project and participating projects, and for other purposes.

In his address to the Congress on the state of the Union, President Eisenhower said (H. Doc. No. 1, 84th Cong., p. 8):

"* * * the Federal Government must shoulder its * * * partnership obligations by undertaking projects of such complexity and size that their success requires Federal development. In keeping with this principle I again urge the Congress to approve the development of the upper Colorado River Basin to conserve and assure better use of precious water essential to the future of the West."

Likewise in his budget message (H. Doc. No. 16, 84th Cong., p. M65) the President said:

"I also recommend enactment of legislation authorizing the Bureau of Reclamation to undertake construction of two comprehensive river-basin improvements which are beyond the capacity of local initiative, public or private, but which are needed for irrigation, power, flood control, and municipal and industrial water supply. These are the upper Colorado River Basin development in the States of Colorado, Utah, Wyoming, Arizona, and New Mexico, and the Fryingpan-Arkansas development in Colorado. The Colorado River development will enable the upper basin States to conserve floodwaters and to assure the availability of water and power necessary for the economic growth of the region. * * * Sale of power generated at these developments will repay the power investment within 50 years and will make a contribution toward repayment of other investments."

In the budget itself it was pointed out (p. 830) that the administration proposes to initiate construction of the Colorado River storage project during the next fiscal year if it is authorized and that the budget includes an item for funds to be requested for this purpose.

The substance of our views on the proper contents of a bill to implement the President's recommendation and particularly on those projects and units which should be covered in the initial legislation is contained in the draft of bill which was developed by the Bureau of the Budget in collaboration with this Department and submitted to your committee on April 1, 1954, in connection with S. 1555, 83d Congress, a predecessor of the present S. 500.

We recommend that S. 500 be examined in the light of the proposal there made and in the light of the two letters dated March 18, 1954, from the Director of the Bureau of the Budget to your committee and to this Department which are reprinted in Senate Report No. 1983, 83d Congress, and that, with suitable amendments, S. 500 be enacted.

The Bureau of the Budget has advised that there would be no objection to the submission of this report to your committee.

Sincerely yours,

FRED G. AANDAHL,
Assistant Secretary of the Interior.

Senator ANDERSON. I would like to have the record show that the chairman of the committee, Senator Murray, is here; and if at any time, Senator Murray, you desire to submit a statement or to take part in the discussion, we are more than honored to have you here.

The CHAIRMAN. Thank you, Mr. Chairman.

Senator ANDERSON. Congressman Dixon from the House is here today, and I know we are glad to have him here.

I believe the first witness is Mr. Aandahl. While he is getting ready, I advise that Senator Allott will be here very shortly.

Mr. Secretary, we are glad to have you back with us again. We appreciate your interest in reclamation, and contributions you have made to it and your willingness to be ready at an early time on this bill here today. Thank you for coming.

STATEMENT OF FRED G. AANDAHL, ASSISTANT SECRETARY, DEPARTMENT OF THE INTERIOR

Mr. AANDAHL. Mr. Chairman, thank you. We appreciate the opportunity of appearing before your committee.

At this time I would like to read a brief statement indicating the strong support of the executive branch of the Government for this project.

On June 28, 1954, representatives from the Department of the Interior were before a previous session of this committee to explain in detail the Department's recommendations concerning the proposal and the legislation for the Colorado River storage project and participating projects. Our purpose here today is to reiterate those recommendations which remain essentially unchanged.

I will not attempt to restate our recommendations and will leave the details to those who will follow me. However, I wish to bring to your attention some recent items which I believe are important in your consideration of the legislation proposed in S. 500.

The proposed development of the Upper Colorado River Basin received the personal attention of President Eisenhower during his visit last fall in the West. The need for and the great benefits to be derived from this development so impressed the President that he included in his address to the Congress on the state of the Union the following:

> * * * the Federal Government must shoulder its * * * partnership obligation by undertaking projects of such complexity and size that their success requires Federal development. In keeping with this principle, I again urge the Congress to approve the development of the Upper Colorado River Basin to conserve and assure better use of previous water essential to the future of the West.

Likewise in his budget message the President said:

> I also recommend enactment of legislation authorizing the Bureau of Reclamation to undertake construction of two comprehensive river-basin improvements which are beyond the capacity of local initiative, public or private, but which are needed for irrigation, power, flood control, and municipal and industrial water supply. These are the upper Colorado River Basin development in the States of Colorado, Utah, Wyoming, Arizona, and New Mexico, and the Fryingpan-Arkansas development in Colorado. The Colorado River development will enable the upper basin States to conserve floodwaters and to assure the availability of water and power necessary for the economic growth of the region. * * * Sale of power generated at these developments will repay the power investment within 50 years and will make a contribution toward repayment of other investments.

The Administration proposes to initiate construction of the Colorado River storage project during the next fiscal year if it is authorized and the budget includes an item for funds to be requested for this purpose.

Although feasibility reports are now available for the Gooseberry, San Juan-Chama, and Navaho participating projects, the Department must withhold its recommendations concerning these three proposals until the reports have been reviewed by the affected states, interested Federal agencies, and the Bureau of the Budget. We will, however, be pleased to furnish the factual data this committee desires in its consideration of all projects in the bill.

With respect to the recommended Glen Canyon unit of the Storage Project, the Department proposes to provide the structures necessary for adequate protection of the Rainbow Natural Bridge from damage or destruction. Joint studies are being undertaken by the Bureau of Reclamation and the National Park Service to determine the most effective means of accomplishing the desired protection. Section 7 of S. 500 would authorize the Department to construct these facilities at

the Glen Canyon Reservoir and also facilities at the sites of other storage units and participating projects for recreational uses and fish and wildlife propagation.

Commissioner of Reclamation W. A. Dexheimer and Commissioner of Indian Affairs Glenn L. Emmons are here to make a general statement and introduce the representatives from the field who will present the detailed testimony of the Department.

Senator ANDERSON. Thank you very much, Governor Aandahl.

Naturally I have only one question that concerns me, and that is this reference to the Gooseberyy, San Juan-Chama, and Navaho participating projects. As you well recognize, I am very much interested in those projects which concern New Mexico and of course all of the rest of them. Last year we did not have any recommendation on them but more or less a recommendation that they be withdrawn from the project.

Subsequently, there was testimony by the Bureau of Reclamation that feasibility reports were going forward. Since these have to be submitted to the affected States, I am not going to ask you for any other comment except, Do you not feel that there is progress on these projects and they are in better shape now than they were a year ago?

Mr. AANDAHL. Yes, there has been a great deal of progress made in the study of those projects, and I think our field people who are familiar with them can give you some very helpful information for your committee's use.

Senator ANDERSON. The fact that the President's message specifically mentioned all the States would indicate that he wanted as many projects as were feasible underway in those States and not eliminate any particular one.

Mr. AANDAHL. That is correct.

Senator ANDERSON. Senator Watkins.

Senator WATKINS. The fact is that reports have now been received from the field with respect to the three projects that were mentioned, Gooseberry, the Navaho, and the San Juan-Chama?

Mr. AANDAHL. The reports, as far as the work of our field staffs is concerned, have been completed, and they have been brought in to the Washington office and will be sent out to the affected States and to the other interested Federal Departments. We must await the comments from those before we can complete our report and forward it to the Congress.

Senator WATKINS. All steps, then, preliminary to the report to the Congress have been taken? Of course, they are awaiting completion.

Mr. AANDAHL. That is, all steps as far as our field work have been completed.

Senator WATKINS. You have already sent them to the other States, as I understand.

Mr. AANDAHL. Yes. Just a moment. I am advised that they have not gone to the other States.

Senator ANDERSON. I do not believe they have.

Mr. AANDAHL. May I ask Mr. Bennett to give the exact information on the status of those reports?

Mr. BENNETT. The reports are in the Washington office and are now being reviewed. They will go to the States as soon as they have received approval out of the Washington office.

Senator WATKINS. How long do you anticipate it will take to get them to the States?

Mr. BENNETT. They should be to the States within 30 days.

Senator WATKINS. And the States have 90 days in which to make their comments?

Mr. BENNETT. Yes, sir.

Senator ANDERSON. That would mean, Governor, if we were going to wait 120 days, that this session of the Congress would have adjourned. Last year we went ahead and included these projects on the basis that feasibility reports were on their way. I was hopeful that we might say that since they have reached the Washington office, they are in better shape now than they were when the bill was reported out 8 months ago to the Congress.

Mr. AANDAHL. That is correct.

Senator ANDERSON. Thank you, Governor.

If there are questions that other Senators may have, even though not members of the committee, I would be happy to have those questions asked at this time.

Senator KUCHEL. Mr. Secretary, does the Department of the Interior endorse all the provisions of S. 500?

Mr. AANDAHL. The Department of the Interior made a full report on the bill that was before the Congress last year, and in our letter to the Congress in connection with S. 500, we have asked the Congress to review S. 500 in the light of the recommendations that we made a year ago. We have indicated that we would be in a position to consider with the committee such modifications as the committee may wish to consider and as might be involved in S. 500. I do not think that I would care to make a full and straight answer to the question that you have asked.

Senator KUCHEL. Can you indicate, Mr. Secretary, the number of projects included in S. 500 which the Department does favor being authorized by this legislation?

Mr. AANDAHL. I believe that I would prefer if those projects could be taken up 1 by 1 as our field people are in who can report about the details of those projects and make any comments that we may wish to make for the Department at that time.

Senator KUCHEL. So that your testimony would be that, speaking for the Department, you would defer answers to that question to those from the field who are here and who presumably will follow you?

Mr. AANDAHL. I would like to have their presentation to the committee before I make a statement for the Department.

Senator KUCHEL. For example, I would like to interrogate as best I can someone from the Department relative to the Glen Canyon Dam. I would want to refer to comments made by the Secretary of the Interior with respect to the difficulties which the Department has run into in its engineering studies on Glen Canyon Dam, and then have some indication made as to whether it is true that within 30 days, as Mr. Bennett suggested, a complete report on Glen Canyon Dam, particularly, will be completed and forwarded to the States.

That is the sort of inquiry I would like to make for this record.

Mr. AANDAHL. I would like to make the general statement that in respect to those engineering questions about the Glen Canyon project, it is my information that the foundation conditions are fully satisfactory for the Glen Canyon project at the elevation that has been recom-

mended by the Department. If it were going to be constructed to a higher elevation to supply replacement storage for some other project, then there might be question about the foundation conditions.

Senator KUCHEL. But that is the type of question you would want someone else from the Department to answer?

Mr. AANDAHL. Yes. Our engineers from the field can give you specific information about the general statement that I have just made.

Senator KUCHEL. I think it is also true that the bill provides for tentative authorization of certain projects, subject, however, to the certification by the Department to the President and the Congress at a subsequent date.

Is that type of proposed legislation approved by the Department of the Interior?

Mr. AANDAHL. Yes. That procedure has been approved by the Department.

Senator KUCHEL. So that it would be fair to say that the Department urges the adoption of legislation to authorize projects in advance of any determination on feasibility?

Mr. AANDAHL. I think that you will find that in these particular projects the study is reasonably well advanced, and our field men will be able to give you some fairly substantial information on those projects.

Senator KUCHEL. Will your field men also be able to answer questions with respect to the application of the Colorado River compact on S. 500 and its provisions?

Mr. AANDAHL. They will be able to give some information on that.

Senator KUCHEL. I do not want to ask the questions of you, Mr. Secretary, if there are others here.

Mr. AANDAHL. There are others who are much better informed on those details than I am, and I would prefer them to present the information.

Senator KUCHEL. That is all.

Senator ANDERSON. Senator Barrett has come in since we started. We did not have statements from many of the Senators. If you desire to make a statement with reference to this bill, you may.

Senator BARRETT. Mr. Chairman, I would like to say for the record that I am 100 percent in favor of S. 500. I hope that this committee can see fit to report out that bill favorably without any material deletions. By that I mean I hope specifically that the Echo Park Dam is authorized along with the other structures there. I think that it is vitally important that we get this legislation on the books as quickly as possible, so that we can move forward to construction of the storage projects in the upper basin. I say that because in my judgment, Mr. Chairman, there is no other way that we can meet the commitments that were made on behalf of the upper States with the lower States in the original compact of 1922, and it would be eminently unfair unless we were placed in a position where we could fulfill the requirements of that compact and at the same time keep some of the water that originates on our own mountains and valleys in Wyoming and the other States in the upper basin to use for the advancement and progress of our States.

I think this bill is fair and equitable, and I hope it is reported and passed by the Senate and the House at this session.

Thank you very much, Mr. Chairman.

Senator ANDERSON. Thank you, Senator Barrett.

We were all very pleased at the strong support we had from you at the last session.

Senator O'Mahoney has come. I was giving opportunity for Senators, if they wish, to make brief statements for the bill or reserve their comments for later if they so desire.

Senator O'MAHONEY. I think the Department of the Interior is for the measure. I am more interested now in listening to whatever possible argument can be made against the bill. I do not see it myself. I am anxiously waiting for those who would prefer to see the upper Colorado River Basin exist forever as a desert made by the floods of a thousand years rather than develop the wonderful mineral and water resources which are there for development by compact among the States ratified by the Congress of the United States.

Senator ANDERSON. Thank you.

Governor Aandahl has just given us a good statement of the Department of Interior's position endorsing the bill generally.

Senator ALLOTT. You know, of course, my support of this matter, but I would like to defer my statement until tomorrow, if I may.

Senator ANDERSON. Surely.

Are there additional questions of Governor Aandahl?

If not, thank you very much, Governor, for being here this morning, and we hope you will be with us through as much of the hearings as possible.

Mr. AANDAHL. Thank you, Mr. Chairman.

Senator ANDERSON. Mr. Dexheimer.

STATEMENT OF WILBUR A. DEXHEIMER, COMMISSIONER, BUREAU OF RECLAMATION, UNITED STATES DEPARTMENT OF THE INTERIOR

Senator ANDERSON. Will you identify yourself for the record and proceed with your statement?

Mr. DEXHEIMER. I am W. A. Dexheimer, Commissioner of the Bureau of Reclamation. I am sorry that I have a little laryngitis this morning, but perhaps the microphone can aid me.

Mr. Chairman, if I may, I would like to put my statement in the record and just briefly review it. I think it will serve the purpose you want in conserving time. I will just highlight the changes.

Senator ANDERSON. Is there objection to letting the statement go in the record as if read and then you make comments on it?

There being no objection, the record will indicate the reading of the statement, and you may go ahead as you wish, Mr. Dexheimer.

Mr. DEXHEIMER. The legislation before you for authorization of irrigation, power, and storage works on the upper Colorado River is the product of extensive investigations and planning by Federal, State, and local agencies. These works are part of a comprehensive basin plan described in the Department's 1950 report, "Colorado River Storage Project and Participating Projects," to harness Colorado River waters for the continued growth of the upper Colorado River Basin States.

I shall briefly review the background of this legislation. An understanding of the problem facing the States of the upper basin in the use of their allotted waters, and the steps that have been taken to plan for such use, are important in your consideration of bill S. 500. Many of you are familiar with this background, but I believe a repetition of the essential facts is desirable and should be part of this record.

The Colorado River compact of 1922 apportioned to the upper basin a beneficial consumptive use of 7.5 million acre-feet per annum. It also imposed an obligation on the upper basin not to deplete the flow at Lee Ferry, the point of division between the upper and lower basins, below 75 million acre-feet in any period of 10 consecutive years. There are further provisions in the compact relating to the use of Colorado River water, but the two mentioned are the controlling and important limitations in the upper basin. With the uneven flow of the Colorado River—erratic periods of drought and flood—substantial water developments within these limitations in the upper basin are impossible without river regulation. Bureau of Reclamation studies show that, unless adequate storage capacity is provided to harvest flood waters of abnormal years, only about 60 percent of the water apportioned to the upper basin could be used.

After some 20 years of investigations, the Bureau of Reclamation issued the Colorado River Basin Report in 1946 covering potential development of the Colorado River including over 100 irrigation and power projects in the upper basin. This report was an inventory and served as a guide for planning and compact negotiations.

In 1948 the upper Colorado River compact was signed. It apportioned among the States of the upper basin the use of the water allotted them as a group by the 1922 compact. The compact is a comprehensive document covering the many phases of interstate and intrastate river development. It makes possible specfiic plans for further use of Colorado River water in the upper basin. With it as a foundation, the Bureau of Reclamation issued in 1950 its report on the Colorado River storage project and participating projects. This report, submitted by the Secretary of the Interior to the President on December 4, 1952, presented a basin plan for the upper Colorado River.

The basin plan is designed to permit further development of the apportioned waters of the upper Colorado River by the State of Wyoming, Colorado, New Mexico, Utah, and Arizona. It includes a number of storage dams at the most efficient and economical sites on the river and its tributaries in the upper basin. In addition, multiple-purpose, water-use projects are planned to allow each State of the upper basin to use its share of the water for irrigation, industrial and municipal development, power, recreation, fish and wildlife, and other beneficial uses.

The Department of the Interior recommends for initial authorization the Glen Canyon and Echo Park storage units and 11 irrigation and multiple-purpose projects, known as participating projects. These units and projects are presented in the Secretary's report, printed in House Document No. 364, 83d Congress, 2d session. The States of both upper and lower basins and interested Federal agencies have approved the recommendations for an initial development. There are, however, problems requiring further study prior to ultimate development of the upper basin. Although an integral part of the basin

plan, the storage units and participating projects recommended for authorization are justified in themselves and can be considered on their own merits apart from their contribution to future development.

The development of the upper Colorado River Basin has been approved by the President, and the initial program would be in accord with the President's program.

The Glen Canyon and Echo Park units were selected for initial development because of their efficiency and economy. The 11 initial participating projects are supported by reports outlining their economic justification and engineering feasibility. The basin plan, however, provides for the submission of feasibility reports on additional storage units and participating projects as their needs arise and information pertaining to their economic and engineering feasibility has been ascertained.

Although I desire to leave to representatives from the field the discussion of details of the features contained in Senate bill S. 500, I do wish to make a brief statement to clarify our position with respect to specific problems associated with the proposed construction of the Glen Canyon and Echo Park Dams.

A reservoir created by a 700-foot dam at Glen Canyon, if unrestricted, would encroach on the Rainbow Bridge National Monument by backing water up Bridge Creek under the natural arch. The Bureau of Reclamation and the National Park Service are undertaking joint investigations to determine the most effective means of preventing this encroachment. The Glen Canyon Dam should be built to the maximum height consistent with economy, the safety of the structure, and adequate protection of the Rainbow Natural Bridge. Our studies indicate that a concrete dam rising 700 feet above bedrock and 580 feet above the river and creating a reservoir of 26 million acre-feet would meet these criteria.

Echo Park Dam, proposed to be built on the Green River in Colorado 3 miles from the Utah State line, would be approximately 690 feet above bedrock and the reservoir, at full capacity, would be 520 feet deep at the dam. The canyons of the Green and Yampa Rivers average 1,500 to 2,000 feet deep.

The Department's plan for the Echo Park unit includes a program by the National Park Service for developing recreational facilities at an estimated cost of $21 million. These facilities would include roads and trails, campgrounds, picnic areas, lodges, beaches, and boat landings. Interpretive museums and headquarters for personnel would also be constructed. Such facilities would make many points of interest accessible to the general public and provide the means for educational and recreational activities. The facilities of the plan will enormously increase opportunities for use of the monument and open the canyon area to the general public where now it is almost inaccessible and has been seen by only an adventurous or privileged few.

Opposition to Echo Park Dam has been based on the grounds that it would destroy the scenic and white-water boating values of the Dinosaur National Monument and set a precedent for the invasion of other national park areas. Proponents of this dam, on the other hand, claim that the recreational values of the monument would be greatly enhanced as a result of the dam's construction and that no precedent is involved since the President's proclamation enlarging the monument provided for such development.

The original 80-acre Dinosaur Monument, created in 1915, contains all the known fossils in the area. This area is 20 miles away and downstream from any reservoir development. It would not be disturbed. There are no improved roads in the area except to the fossil beds.

The proposed use of the canyon sections of the Dinosaur National Monument for water and power developments was contemplated long before the original 80-acre area was enlarged to its present size of over 200,000 acres in 1938. A number of power site withdrawals prior to that year are evidence of this fact. Recognition of the importance of these potential power developments was given in the President's proclamation enlarging the 80-acre monument. The supervision of the area by the National Park Service under this proclamation was not to affect the operation of the Federal Water Power Act of June 10, 1920, as amended, and adminstration of the monument was subject to the reclamation withdrawal of October 17, 1904.

The plan before you for coordinating the development of the water and power resources of Green and Yampa River Canyons along with their scenic and recreation values is therefore consistent with the language and spirit of the proclamation. The Department has no doubts as to the appropriateness of creating an artificial lake and adjoining facilities within the bounds of this particular national monument. It would not create a precedent for invasion of other parks. The precedent, if any, was created in 1938 when the boundaries were extended to the canyon areas with a clear understanding that water conservation and power development had prior right to the use of those areas.

Returning now to the initial development recommended by the Secretary of the Interior, we find that its construction and operation would result in material and important accomplishments.

The participating irrigation projects would provide a supplemental water supply to farms now subject to drought and crippling water shortages, thus permitting farmers to stabilize their production. A full water supply would be created for the development of new farms and homes. The production of crops of the upper basin States would be increased. A necessary balance in the livestock industry would be achieved through the production of field crops to supplement the use of the extensive rangelands in the area. This agricultural development would not only increase the farmers' income and raise their standard of living, but also would meet the expanding demands of an increasing population. The recommended projects would also supply water needed to meet rapidly expanding municipal and industrial requirements. New farms, growing rural communities, and associated growth in urban and industrial areas would contribute to a sound and stable economy vital to our national development.

Highly developed sections in the upper basin States are also looking to the upper Colorado River for an enlarged water supply. Areas in the upper Colorado Basin will be called on to provide many of our most vital resources. From them will come much of the Nation's supply of such products as copper, uranium, phosphate, shale oil, and coal, as well as other resources found abundantly in the upper basin States.

A significant contribution to the upper Colorado River Basin would be the power, totaling more than 1 million kilowatts of hydroelectric

generating capacity, which would result from the recommended development.

Electric power is needed in the upper basis States to further commercial and industrial expansion and for use in the homes and on the farms. The total peak electric powerload now amounts to approximately 1½ million kilowatts in the upper basin States and is continually increasing. The project will assist in meeting the new electric load growth in the area estimated to total about 150,000 kilowatts a year.

This is a bare outline of the facts on which more detailed information will be given by Regional Director E. O. Larson. I am aware of the magnitude of the undertaking before you and its significance to the future of the people of the upper Colorado River Basin. For this reason I consider the initial development of the plan for upper Colorado River Basin development the greatest single task I have faced as Commissioner of Reclamation.

We feel very strongly that this project is one of the most significant for the development of that wide area and also for the economic growth of the entire country.

Thank you, Mr. Chairman.

Senator ANDERSON. Senator Watkins, have you any questions?

Senator WATKINS. I have no questions.

Senator ANDERSON. Senator O'Mahoney?

Senator O'MAHONEY. Mr. Dexheimer, in view of the fact that there are many people, particularly in the East, who seem to believe that this is an unjustifiable invasion of the theory and principle of conservation, may I ask you what your opinion is upon that particular phase of the matter?

Mr. DEXHEIMER. Are you particularly concerned about Echo Park, Senator?

Senator O'MAHONEY. That is right. The whole thing and Echo Park, too.

Mr. DEXHEIMER. Senator, the thing that we feel is most vital to the economic benefit of the country and people in general is the development of water and the use of that water where it is so scarce as it is in the western part of the United States. I think that water problem is being brought to the attenion of people all over the country, realizing how essential the water is to their economic need.

As to the invasion, you might say, of what are considered park areas, I have spent considerable time in these Glen Canyon and Echo Park areas myself. You have to take a jeep or, some other of that kind of vehicle to get in to see the canyons at all in Echo Park. There is only one way to go to Glen Canyon, and that is by boat on the river, and it is a very difficult trip. Very few people have ever seen it. In my opinion, there is a tremendous area of similar scenery, similar boating on the rivers, and similar formations in the rocks that can be seen for hundreds of miles along the river and they have been seen while this has not.

The area now is practically desert, given over to a little sheep grazing in Echo Park. There is, in my opinion, really no precedent being set because the President's proclamation in 1938 specifically reserved this area for power and irrigation development sites. The need for water conservation and use is very great, and the beneficial storage of water is so much more important than a little bit of scenery.

I think it is impossible to imagine, for a westerner at least, the idea that you could save the river for a park rather than utilize it.

Senator O'MAHONEY. Is this a park?

Mr. DEXHEIMER. It is not a park in the normal sense of the National Park System.

Senator O'MAHONEY. Was it ever created a park by act of Congress?

Mr. DEXHEIMER. No, sir, it was not. It was developed as a national monument including 80 acres in 1915 to set aside an area for excavation of dinosaurs. That area will not be disturbed. It is completely outside of the reservoir areas.

Senator O'MAHONEY. The Dinosaur National Monument in which there are still to be found dinosaur bones is not to be inundated or affected at all by this project; is that the fact?

Mr. DEXHEIMER. That is correct. It will not be even close to any of the Echo Park project works. That is the only area of the monument that has been developed at all, with a very meager amount being spent for excavation of the dinosaurs up to date.

Senator O'MAHONEY. A moment ago in answer to one of my questions you spoke of a little sheep grazing in this area to be inundated. Are sheep being grazed there now?

Mr. DEXHEIMER. Yes, sir. They are. That was one of the problems at the time the monument was enlarged in 1938. The local people insisted that this would be different than other national parks or monuments and that sheep grazing must be permitted within the boundaries of the extended area.

Senator O'MAHONEY. And it is permitted?

Mr. DEXHEIMER. That is permitted now.

Senator O'MAHONEY. Is that a precedent for permitting grazing in any other national park?

Mr. DEXHEIMER. It could be considered so if you consider this a national park.

Senator O'MAHONEY. But you have already testified that this is not a national park.

Mr. DEXHEIMER. That is correct.

Senator O'MAHONEY. It is a national monument; is it not?

Mr. DEXHEIMER. Yes, sir. The boundaries were only extended after a complete hearing of the power, irrigation and storage potentials in the area and the grazing rights that the people claimed in that area, and those things were specifically excluded.

Senator O'MAHONEY. The boundaries of the national monument were extended in 1938; were they not?

Mr. DEXHEIMER. Yes, sir.

Senator O'MAHONEY. There was grazing by sheep in that area at that time?

Mr. DEXHEIMER. Yes, sir.

Senator O'MAHONEY. And when the extension was ordered by proclamation of the President, not by action of Congress, the grazing was permitted?

Mr. DEXHEIMER. Yes, sir.

Senator O'MAHONEY. In 1938? 1938 is some time ago; is it not?

Mr. DEXHEIMER. Yes, sir. Some 18 years.

Senator O'MAHONEY. You are a member of the Department of the Interior staff. Have you ever heard anybody in the Department of

the Interior, and particularly in the National Park Service complain that by reason of the National Park Service allowing grazing in a national monument, grazing in some other national park was just around the corner?

Mr. DEXHEIMER. No, sir, I have not.

Senator ANDERSON. Thank you, Senator O'Mahoney.

Senator Watkins.

Senator WATKINS. Mr. Dexheimer, you mentioned something about the scenery. I know that what I am going to ask you has been asked many times and been discussed many times. But whatever scenery there is in the Echo Park region will not be destroyed by this building of the dam; will it?

Mr. DEXHEIMER. No, sir, I believe not. The canyons, starting with the Green and Yampa Rivers are from 1,500 to 2,000 feet in depth, rising almost vertically in many places and in some places overhanging. The water would be raised about 520 feet by construction of Echo Park Dam which would still leave tremendous amounts of the steep canyons exposed, and of course the surrounding country would all be available.

In addition to that, of course, the plan of the Department is to provide some roads and access into the area and develop recreational facilities.

Senator WATKINS. I know a sum of $21 million is mentioned to be authorized for the building of a recreation area and making this area available for people who would like to use it for that purpose.

Mr. DEXHEIMER. Yes, sir. That is the Department's recommendation.

Senator WATKINS. With reference to the words "Echo Park," do you know how this area came to be known as Echo Park? I think many people have been deceived and think this is actually a national park just because it is called Echo Park.

Mr. DEXHEIMER. I am not familiar with that name, but I have been in the area, and I think it is called a park simply because there is a place down below there about 50 yards wide that is covered with water during flood season that they call a park and use it for grazing of cattle and sheep during the nonflood times.

Senator WATKINS. I lived in the area as a boy, and I happen to know that there are many places on that stream that are called parks that have no relationship whatever to a national park.

For instance, there is an island park there, near that very area.

Mr. DEXHEIMER. Yes, sir. And Brown Park.

Senator WATKINS. Meadow Park and Mountain Park. I have visited those streams during my boyhood. That was a long time before anybody ever considered taking that area as a national park or monument.

Mr. DEXHEIMER. Yes, sir.

Senator WATKINS. Most of the people have actually been deceived because it is referred to as a park. It is unfortunate for the people that it was so named and it has stirred up so much controversy because they take Echo Park, thinking it one of our national parks. I want to make sure that is made clear before this body.

Senator ANDERSON. Mr. Dexheimer, in the hearings last year, Senator Millikin asked me what I wanted to have put in the bill, and I

just want to read the words. I said, "I want the Navaho Dam put in the bill as an initial project as the House put in the Curecanti Dam and the Glen Canyon and Echo Park Dam. The Navaho Indians have rights in this matter."

Senator Millikin asked: "Why cannot the Navaho Dam be put in the bill in accordance with Senator Anderson's suggestion?"

You answered, "There is no reason at all."

May I ask if anything has happened in the meantime to change that statement? On the contrary, has not there been advancement of the studies you have made in the area?

Mr. DEXHEIMER. There has been advancement, and the statement would still be good.

Senator ANDERSON. Congressman Keith Thomson, of Wyoming, has come in. We are happy to have you here, Congressman Thomson, and we hope you will feel at home and participate as you desire in this hearing.

Representative THOMSON. Thank you.

Senator ANDERSON. Are there other questions of Mr. Dexheimer? Senator Kuchel.

Senator KUCHEL. Mr. Dexheimer, you are acquainted with the Colorado River compact?

Mr. DEXHEIMER. Yes, sir.

Senator KUCHEL. And unquestionably the rights and responsibilities of the compact in your judgment must completely be respected in any legislation such as this to provide for Colorado River storage projects?

Mr. DEXHEIMER. Yes, sir.

Senator KUCHEL. How much is the average annual water supply in the Colorado River?

Mr. DEXHEIMER. Senator, for the details of the engineering, I would like to rely on my regional director, Mr. Larson, who is here and available; but to answer your question, the average is about 15.4 million acre-feet per year, virgin flow at Lee Ferry, which is the division point between the upper and lower basins.

Senator ANDERSON. Would you not have to say what particular year you were using to make that average? It could be one 10-year period that is is higher and another 10-year period that it is lower. Is your figure based on a record of 30 or 40 years?

Mr. DEXHEIMER. My figure is based on our report which covers a period of 40 years.

Senator KUCHEL. So your answer is that over the last 40-year history, the average water supply in the Colorado has been 15.4 million?

Mr. DEXHEIMER. No, sir, it is based on our 40-year period in our report.

Senator KUCHEL. And your answer based on that 40-year period is an annual average water supply of 15.4 million acre-feet?

Mr. DEXHEIMER. Yes, sir.

Senator KUCHEL. I am going to read three short sentences which were uttered by a distinguished American citizen interpreting the compact, and I am going to ask you whether or not you agree with these conclusions.

No. 1:

The upper and lower basins were each apportioned from the Colorado River system, the exclusive beneficial consumptive use of 7,500,000 acre-feet of water per annum, and in addition the lower basin was given the permission to increase its beneficial consumptive use of an extra million acre-feet per annum, of surplus water.

Do you agree with that statement, Mr. Dexheimer?

Mr. DEXHEIMER. I think in general terms that is the sense of the compact, but there are so many complicating factors as to how you measure it and other items that you have to have a great deal more background than just that simple statement.

Senator KUCHEL. But it would be important to have all those complicating factors and items completely understood before the Department of the Interior could administer properly the upper Colorado River storage project, is that not right?

Mr. DEXHEIMER. I do not believe so, Senator, because the water is not being used to the full amount that is apportioned and probably would not be for 50 or 75 years yet. If you were getting down to the last acre-foot apportioned water, yes, but we will not reach that for 50 or 100 years yet.

Senator KUCHEL. While I have 2 more statements I want to read, if we are talking about a 40-year average of 15.4 million acre-feet, if we add 7,500,000 acre-feet of water per annum, as in this statement it is stated that such amount was apportioned both to the upper basin and the lower basin, we reach in combination a figure of 15 million right there. Is that not correct?

Mr. DEXHEIMER. You understand that this 15.4 is an average over a 40-year period which we used in our report. There are also tributaries downstream in the lower basin which are not measured in that.

Senator KUCHEL. How much in addition would those tributaries downstream provide?

Mr. DEXHEIMER. I am sorry I do not have the figure on the runoff on those at the present time.

Senator KUCHEL. Let me read the second statement and see whether you agree with this in general terms:

However, the 7,500,000 acre-feet awarded to the lower States had a very clear priority over the 7,500,000 acre-feet awarded to the upper States.

Do you agree with that statement of the compact?

Mr. DEXHEIMER. I do not believe I do just flatly agree with that statement. I think it was an apportionment as between the basins in which each had a right to that, but with the further provision which you also have there, I am sure, that the upper basin must not deplete the water beyond 75 million acre-feet in any 10-year period, measured at Lee Ferry.

Senator KUCHEL. Would it be your testimony that it would be important to have that type of question answered by the Department of the Interior before it could effectively administer such a project as is embodied in this legislation?

Mr. DEXHEIMER. Absolutely not, because even with this development and for a period of 25 or 30 years yet, there will still be available to the lower basin an excess of water over that used beneficially in the upper basin. So, we do not have to face those questions for a great many years yet.

Senator KUCHEL. Is there any dispute on that point, Mr. Dexheimer? Are there any people who would disagree with your statement on the availability of water?

Mr. DEXHEIMER. They might disagree as to the amount. I think they would not disagree as to the fundamental that there would be more than the upper basin can consumptively use for the next 25 or 30 years.

Senator KUCHEL. I will read one final statement of this quotation:

> In reality, the compact gave the lower States 7,500,000 acre-feet of water per annum and the upper States that much water if there should be any water left in the river, provided the upper States use that water for domestic or agricultural purposes.

Is that a fair statement of your understanding of what the compact has done?

Mr. DEXHEIMER. Yes, I think that is true if that were the only part of it.

Senator ANDERSON. I hope you will think a long time before you say that is true.

Senator KUCHEL. The witness has said that is true.

Mr. DEXHEIMER. In this respect, Senator, the upper basin is committed to delivery of 75 million acre-feet in a 10-year period, which essentially answers your question. But the upper basin must also have replacement reservoirs to use beneficially what they can out of their part, and if there should be a shortage, the upper basin could still beneficially use their part, meeting still their commitment from replacement reservoirs over the 10-year period.

Senator KUCHEL. I do not know that I understand you. Let me ask you this. Under the Colorado River compact are the upper States required to deliver 7½ million acre-feet of water at Lee Ferry for the benefit of the lower States?

Mr. DEXHEIMER. No, sir, not every year. It is 75 million acre-feet in a 10-year period.

Senator KUCHEL. Then your answer to that question is no, but your answer is yes to the question whether, in a 10-year period, the upper States are required to deliver 75 million acre-feet of water in a 10-year period at Lee Ferry? Is that correct?

Mr. DEXHEIMER. Yes, sir.

Senator KUCHEL. Can you state what the storage capacity of Glen Canyon Dam is, Mr. Dexheimer?

Mr. DEXHEIMER. Approximately 26 million acre-feet.

Senator KUCHEL. Where is Glen Canyon located with respect to Lee Ferry?

Mr. DEXHEIMER. About 16 miles upstream.

Senator KUCHEL. Would it be the project encompassed in this bill nearest to the delivery point at Lee Ferry?

Mr. DEXHEIMER. Yes.

Senator KUCHEL. Over what period of time would the Department of the Interior contemplate the storage of 26 million acre-feet at Glen Canyon?

Mr. DEXHEIMER. It would depend entirely on the runoff and the deliveries that they were able to make to the lower basin.

Senator KUCHEL. What I am getting around to is this: I think Senator O'Mahoney suggested what questions could be raised in the development of this type of multiple-purpose project. What I am

trying to do is to find out whether in your mind or in the mind of people representing the Department of the Interior there is a requirement to interpret the Colorado River project with respect to the administration of the projects under this bill, and whether, if that is so, there is an agreement as to what the responsibilities are.

I will give you an example of what I mean. Suppose Glen Canyon Dam is built. Suppose water runs into Glen Canyon Dam. Suppose the water running into Glen Canyon Dam is less than 7,500,000 acre-feet for a matter of several years. The Department of the Interior would have a responsibility under this bill either to operate the dam and let the water run down to Lee Ferry or to close it.

I would like to know what the Department of the Interior would do if there were an average, let us say, of 5 million acre-feet running into the Glen Canyon Dam. What would the Department of the Interior consider its responsibility with respect to letting water run on down to Lee Ferry?

Mr. DEXHEIMER. It would certainly have to respect the contracts that we have for the use of water downstream and let a sufficient part come down to take care of those commitments.

Senator KUCHEL. That is true. I want to have this record crystal clear as to what the Department of the Interior believes is the responsibility and requirement under the Colorado River compact. So, I come back to the statement which Senator Anderson questioned:

> The compact gave the lower States 7,500,000 acre-feet of water per annum and the upper States that much water if there should be any water left in the river, provided the upper States use that water only for domestic or agricultural purposes.

My question again is: Do you agree with that statement of interpretation of the compact?

Mr. DEXHEIMER. Senator, I will have to explain this way. There are projects now in the upper Basin that are entitled to beneficial consumptive use of water. There are also contracts and projects in the lower basin similarly entitled to water. We feel that our first duty is to see that those projects have the necessary water to keep them in operation and to meet our commitments under the various contracts.

Senator KUCHEL. Operation for what purpose?

Mr. DEXHEIMER. For beneficial consumptive uses that are within the contracts that the Secretary of the Interior has in the lower basin and those projects which are using water beneficially in the upper basin.

Senator KUCHEL. What rights are permitted under your phrase "beneficial consumptive use"?

Mr. DEXHEIMER. They are in accordance generally with State laws for domestic and industrial uses, irrigation and other uses, with the power generally coming last in priority.

Senator KUCHEL. Would it include, in your judgment, authority to utilize waters for the generation of hydroelectric power?

Mr. DEXHEIMER. Only to the extent it would not interfere with other beneficial consumptive uses.

Senator KUCHEL. Can you point to the provisions in the Colorado River compact which support that view of yours?

Mr. DEXHEIMER. I do not have the compact with me now. I could ask Mr. Bennett who is here and has that information.

Senator ANDERSON. He may testify on that later on.

(See p. 133.)

Senator KUCHEL. Now, Mr. Dexheimer, going back to my question, what would the Department of Interior do with respect to providing water from Glen Canyon to Lee Ferry for use in the lower basin States under a situation where Glen Canyon Dam would have, let us say, less than 7½ million acre-feet?

Mr. DEXHEIMER. I think, Senator, I could best answer that by saying what we are doing this year at Hoover Dam which is the storage reservoir for the lower basin. We are curtailing the generation of power there, holding the water for use of the contracts for municipal, industrial, and irrigation.

Senator KUCHEL. Why are you curtailing the use of the water now at Hoover Dam?

Mr. DEXHEIMER. Because we have had low run over the past year or so, and we have had to save that water so it can be utilized at the proper time as the first priority calls for it to be used.

Senator KUCHEL. Assume that low runoff period with the Glen Canyon Dam constructed; what would be your guide lines in determining how much water to send from Glen Canyon Dam down to Lee Ferry?

Mr. DEXHEIMER. The contracts and commitments of the United States in the lower basin, which include the Republic of Mexico, the various irrigation and municipal uses in the lower basin.

Senator KUCHEL. When you say the contracts, you would include the Colorado River compact, obviously.

Mr. DEXHEIMER. Yes; that is the provision for the development.

Senator KUCHEL. Reasonable men have taken a different side on the question of what kind of water ought to be delivered at Lee Ferry to the lower States. You have suggested that it may be an average over a 10-year period of 75 million acre-feet. There are others who would contend that it must be 7,500,000 acre-feet minimum per year.

Is it not necessary to have the proper legal answer to that question before you could effectively discharge your responsibility under this legislation?

Mr. DEXHEIMER. No, sir. I think it would be absurd to say that it had to be every year, because when the compact was drafted before 1922, it was known then that there are times when the total runoff of the river does not come up to 7½ million acre-feet.

Senator KUCHEL. Would your comment of absurdity change if the United States Supreme Court held that it was a responsibility to deliver 7½ million acre-feet a year?

Mr. DEXHEIMER. I do not know how we would do it if there were only 4 million in the river.

Senator KUCHEL. You are an engineer?

Mr. DEXHEIMER. Yes, sir.

Senator KUCHEL. And you have a 26 million acre-feet dam. You would presumably accumulate water running into that dam year in and year out. You suggested that the reason you have curtailed the use of water for power at Hoover Dam is because there is a low runoff period.

Let me ask the question: Has there ever been a period under the Colorado River compact where less than 7,500,000 acre-feet has been delivered at Lee Ferry?

Mr. DEXHEIMER. Yes, because some years there has been a little over 4 million total at Lee Ferry.

Senator KUCHEL. What years were those when there was less?

Mr. DEXHEIMER. I do not have that information here.

Senator KUCHEL. Obviously if there were less than 75 million acre-feet in a 10-year period, even your interpretation of the contract would result in a nullity if that much water was not available in a 10-year period.

Mr. DEXHEIMER. The compact I think also makes provision for sharing shortages and also for sharing the commitments of the United States to the Republic of Mexico.

Senator KUCHEL. So that I am sure that you may answer the hypothetical question which I raised, what would the Department use as a guide line in releasing water from the Clen Canyon Dam for delivery at Lee Ferry? I think your answer was the contracts and the Colorado River compact.

Mr. DEXHEIMER. Yes, sir.

Senator KUCHEL. You suggested that it would be absurd to interpret the compact in such a way that 7½ million acre-feet per year should be delivered.

Mr. DEXHEIMER. That would be absurd because if it was not in the river, obviously we would be unable to do it.

Senator KUCHEL. That is right. However, if there were that much available in Glen Canyon Dam, then how would the Department discharge its responsibility?

Mr. DEXHEIMER. The same as we are discharging them at Hoover now, by meeting the commitments to the Republic of Mexico, and to the contractors in the lower basin for water supply to which they are entitled under their contracts.

Senator KUCHEL. How much water in total are they entitled to under their contracts?

Mr. DEXHEIMER. That, I think, is a question of interpretation which I would prefer not to answer at this time, Senator, because there are so many complicated factors involved in it.

Senator KUCHEL. I say again I know nothing about engineering. What I am trying to actually do is to explore and find the truth, and determine whether or not there is a responsibility to find out what is the right and what is the liability under the Colorado River compact. In doing that, it must be true that the manner in which that compact is interpreted has a direct bearing on the responsibility of the Department of the Interior. Would you not agree with me on that?

Mr. DEXHEIMER. I think you are correct; yes.

Senator WATKINS. Before you leave this subject, I wonder if I could ask a question or two.

Senator KUCHEL. Yes, sir.

Senator WATKINS. In the planning of the upper Colorado storage project, kept in mind was the necessity of fulfilling the commitments downstream; was it not?

Mr. DEXHEIMER. Yes, sir.

Senator WATKINS. Is it not a fact that if the dams are constructed as planned on the main stem of the river, and they are finally filled, that it will likely be possible to discharge enough water downstream to take care of the consumptive needs each year?

Mr. DEXHEIMER. Yes, sir; I think it will be even more possible than it has been in the past, because we have had at times to release flood waters from the Hoover Reservoir in order to make space. That water is wasted. Every year we are wasting water into the gulf because we do not have adequate storage now to take care of it.

Senator WATKINS. In other words, the controlled river upstream will make it possible for not only the lower basin to get its water regularly, so that there will be a constant steady supply, but it will also make it possible for the upper basin to get its water as well?

Mr. DEXHEIMER. It is the only way we can develop the upper basin so that it can get anywhere near its share of the water. That is, by these long-range holdover storage reservoirs we can make these years of plenty count, and store the water in years of plenty for use in the years of drought.

Senator WATKINS. As a matter of fact, the building of the upper storage project should be greatly to the benefit of the lower basin, in the regulation of the flow of the water and the supply they will be able to get.

Mr. DEXHEIMER. Yes, sir. If we could have stored water a few years back from excess, it would have been available now and would certainly be beneficial not only in the upper basin, but the lower basin.

Senator WATKINS. I take it for granted that there might be times during the period after the dams are constructed and depending on the order in which they are constructed that, in order to fill those reservoirs, it might be necessary to rely upon the 1922 compact provision that only the 75 million acre-feet would have to be delivered during the 10-year period. In other words, in order to get them filled, you would have to use the full benefits of the contract and agreement with respect to the 75 million acre-feet delivered.

Mr. DEXHEIMER. Yes, sir. They would have to be curtailed to some extent, of course, in order to fill the reservoirs.

Senator WATKINS. The sooner we get these projects built, the better it will be for all concerned, including southern California, which will then have its regular supply without any interruption like the years when there are only 4 million acre-feet in the stream.

Mr. DEXHEIMER. Yes, sir.

Senator ANDERSON. Will you pardon me a moment to say that the reason I objected slightly a minute ago that this matter is probably going to come to the Supreme Court. It is a legal question. You are an engineer, and I thought it would be unfortunate if an engineer settled it before the Supreme Court had a chance to do it. I believe this question of interpretation of whether or not the lower basin States have a complete priority before the roof or upper basin States have a chance at it is one surely that is going to be fought steadily in the Supreme Court.

On that same theory, if carried to its logical conclusion, if the Colorado River drops to where there is only 7,500,000 acre-feet in it per average, California contends that Utah, Wyoming, New Mexico, and Colorado have no rights whatever to any water for any project.

Senator KUCHEL. I deny that.

Senator ANDERSON. I say if you follow it out completely, then we have no rights in the roof States. That has been threshed through the Supreme Court a few times and probably would be again. I at

least would hate to have the interpretation put on the law that California has a complete priority. Mr. Ely and I spent quite a little time on this in the last hearing, but I do hope the legal answers come from the legal representatives of the Department of the Interior on it, because it is a very difficult question. I do not say the Senator from California has taken that position at all. I think he has been fair in this controversy.

Senator O'MAHONEY. I was going to say, Mr. Chairman, I was very happy to hear the Senator from California deny that he holds any such interpretation. By that I take him to mean that he believes that we in the upper basin States should not be compelled to sit on the banks of the stream and watch the water flow down without using any of it, even if in the drought year when that water is far less than that which we are entitled to by the compact signed by the Colorado River Basin States.

Senator KUCHEL. I appreciate that comment from one of my seniors for whom I have a great respect. I do want to say that I do not want to deny a drop of water to anybody who has a right to it.

Mr. Chairman, I do not want to take too much time, but may I ask a few more questions?

Senator ANDERSON. Surely. I was not trying to cut you off. I did believe that the legal question of the interpretation of this contract is not one which an engineer can handle.

Mr. DEXHEIMER. Mr. Chairman, I would like to say that I had no intention of making any legal interpretation. I was just pointing from a practical standpoint what we could do under the circumstances.

Senator ANDERSON. I was not trying to be critical of you.

Senator WATKINS. But nevertheless you were being asked for legal interpretations by the Senator from California.

Senator KUCHEL. Now, I want to be fair, too, but in the statement which Mr. Dexheimer has furnished to the committee, there is a paragraph in which he discusses the amounts of allocation under the Colorado River compact. I do not want to embarrass anyone. It is true that a lawyer ought to answer questions of interpretation. But it does remain, I say most respectfully, Mr. Chairman, in my judgment the responsibility of the Department of Interior to administer S. 500 if it become the law in accordance with the Colorado River compact, and that must require interpretation.

I would like also to say that the three sentences which I read to you, Mr. Dexheimer, and which I think generally speaking you agree with, are statements of the distinguished Governor of Colorado, who used to be in the United States Senate. This is part of the statement Governor Johnston has made.

I will not tie this to a legal basis. Has the Department made any studies with respect to the quantity of water to be delivered at Lee Ferry under the upper Colorado River development?

Mr. DEXHEIMER. Yes, sir, but Mr. Larson has that information.

Senator KUCHEL. And that will be filed with the committee, and we can discuss that at some length with Mr. Larson.

Mr. DEXHEIMER. Yes.

Senator BARRETT. Mr. Chairman, may I ask one question?

Senator ANDERSON. Yes, indeed.

Senator BARRETT. Mr. Dexheimer, I want to congratulate you on your exposition of this matter here this morning. I have been looking

at the last year's hearings on the Colorado River project, and I find at page 146 a tabulated computation of the flow at Lee Ferry. I examined it rather hurriedly. I note that for years, from 1940 to 1947, the flow exceeded 20 million acre-feet at Lee Ferry, and in 13 years it exceeded 15 million acre-feet of water.

I take it from your statement that the only way that the upper basin States can possibly meet their commitment that the junior Senator from California is referring to repeatedly is by storage projects in the upper basin.

Mr. DEXHEIMER. Yes, sir, that is the only way they could have water available year after year.

Senator BARRETT. Approximately 17 years out of these 43 years, the flow has been in excess of the 15 million acre-feet that he mentioned, and in 4 of them in excess of 20 million acre-feet.

Now, Mr. Dexheimer, there is one other point I would like to ask you about, and that is this matter of the power needs of the area. As I recollect, you stated that the power needs are estimated at 150,000 kilowatts per year. The point I have in mind is this: If the power is available, how do you know whether that is a fair estimate or not? In other words, if the power were available in the upper States, is it not true that enterprises would be attracted to that area and come in and be demanding power from you that you cannot anticipate at this time?

Mr. DEXHEIMER. Last year I think you had before this committee the representatives of nine power companies in the area who offered to buy any power over and above project or other Government contracts that was available, and they would not only buy the power, but they would furnish the necessary transmission lines to get it to their load areas. I believe these people are here again to testify to that, because I saw some of them this morning.

Senator BARRETT. The total demands from those people is approximately 150,000 kilowatts.

Mr. DEXHEIMER. Not only that, but they are putting in steam power to meet their needs before this comes into being.

Senator BARRETT. The point I am trying to make, Mr. Dexheimer, is to find out from you if you agree that if the power were available in that area, that numerous industries from elsewhere in the country would like to locate there and relocate their industries, and use the power, if they knew they could get it.

Mr. DEXHEIMER. I think there is no question about that.

Senator BARRETT. I am sure that is correct, too. Thank you very much, Mr. Chairman.

Senator ANDERSON. Mr. Dexheimer, how much water is now being consumed in the upper basin States? Do you have a record of that? Of the 7½ million how much are they now using?

Mr. DEXHEIMER. It is something about 2 million acre-feet. I have been informed it will be 2½ million acre-feet when the authorized projects are developed.

Senator ANDERSON. The present authorized projects?

Mr. DEXHEIMER. Yes, sir.

Senator ANDERSON. If this project were to be authorized, how much more would that take?

Mr. DEXHEIMER. I do not have that figure, Senator. Mr. Larson can give it to you.

Senator ANDERSON. Can he give us an estimate of it?

Mr. DEXHEIMER. The projects recommended in the Secretary's bill would increase that by a million acre-feet, and the projects in S. 500 would raise that another 800,000 for a total of 4,300,000 acre-feet.

Senator ANDERSON. So that if this bill were to be approved, the upper basin States would only be using 4,300,000 acre-feet of their supposedly allotted 7,500,000 acre-feet and by the construction of the storage dams you would be helping to guarantee that the flow downstream might regularly remain 7½ million acre-feet?

Mr. DEXHEIMER. Yes, sir. Of course, you realize that it would be 20 or 25 years before this development, even if it were authorized now, could begin to use that water.

Senator ANDERSON. How much water is California now using out of the Colorado River? How much more than 4 million acre-feet?

Mr. DEXHEIMER. I do not have the figure, Senator. I would be glad to get it for you.

(The information referred to follows:)

Provisional data for recent years on direct diversions by California, from the main Colorado River, less measured returns to the river, are given in the following table. The data do not reflect unmeasured returns from the Palo Verde Irrigation Distict (approximately 65,000 acres), or from the California portion of the Yuma project (approximately 12,000 acres).

California diversions less measured returns to the river

Calendar year:	*Acre-feet*
1951	4,421,000
1952	4,425,000
1953	4,774,000
1954	4,730,000
Average, 1951–54	4,588,000

Senator ANDERSON. The upper basin States are asking for a chance to develop facilities which would permit them to use 4,300,000 acre-feet out of the 7½ million acre-feet which they thought was allotted to them by the Colorado compact and the structures would be useful, would they not, to guarantee that the lower basin States would have their 7½ million acre-feet regularly because of the storage?

Mr. DEXHEIMER. Yes, sir. It would help because as I pointed out earlier, we have had to let water waste into the gulf regularly that could have been stored and would be available. I think the figure is a little over 5 million acre-feet that California is now using.

Senator ANDERSON. What was the amount provided in the limitation act?

Mr. DEXHEIMER. It is 4,400,000 in the California Self-Limitation Act.

Senator ANDERSON. In other words, the self-limitation act provided for California more water than all the upper basin States would be using if the entire Colorado storage project and the participating projects mentioned were to be built and completed 20 years from now.

Mr. DEXHEIMER. Yes, sir.

Senator WATKINS. May I ask how much is Arizona now using, from its part of the lower basin commitment?

Mr. DEXHEIMER. I do not have the figure on that but I believe it is something less than a million acre-feet. The authorized projects are not in full development there yet, either.

Senator WATKINS. So it would be nearly 6 million acre-feet that the lower basin is now using out of the 7½ million?

Mr. DEXHEIMER. Yes, sir.

Senator WATKINS. And a great deal of that has been made possible by reclamation projects which have been developed under the reclamation law.

Mr. DEXHEIMER. Yes. Most of it. Most of the structures on the main stem and most of the later irrigation projects were under reclamation law and developed by the Bureau.

Senator ANDERSON. Are there any other questions of Mr. Dexheimer?

Senator KUCHEL. Mr. Chairman.

Senator ANDERSON. Yes.

Senator KUCHEL. In your answer to Senator Anderson's question, I think a little violence may have been done to what I thought was your answer to Senator Johnson's statement, which I want to have as clear as possible and I recognize again it has plenty of overtones of law in it and legal interpretations. Here again is his statement:

> The compact gave the lower States 7,500,000 acre-feet of water per annum and the upper States that much water if there should be any water left in the river, provided the upper States use that water only for domestic and agricultural purposes.

I thought you suggested that you agreed with that except that it was a 75 million acre-feet over a 10-year period. The point of it is particularly in view of your answer to Senator Anderson, the last part of that, whatever the compact may have given to the lower States, "the upper States have that much water if there should be any water left in the river", so that under the compact, according to the Governor of Colorado, that 7½ million acre-feet responsibility is No. 1. What the 7½ million acre-feet apportioned to the upper basin is subject to is to the discharge of the requirements to the lower basin. Is that not correct?

Mr. DEXHEIMER. No. I should like to make it very clear that I do not propose to answer the question whether that 7½ million acre-feet is a first priority for delivery to the lower basin.

Senator KUCHEL. Then Senator Anderson's question cannot be answered by you because that assumed that there was an equal right on the part of the other upper basin States.

Senator ANDERSON. I did not assume that. I was just trying to point out that the roof States which produce the water are asking to have just a little bit less of the water than the State of California has under the self-limitation act, and a whole lot less than California is now using. Supposedly there was a distribution and division of water. I asked Mr. Ely, when we were having testimony:

> Is not that what I was saying a minute ago? That you view this as an obligation whether or not it means any water to the upper basin? If they had to cut off every irrigation project that has prior appropriation, you still think it has to be done to deliver the lower basin, don't you?

And Mr. Ely said,

> The lower basin and Mexico; yes, sir.

We do not subscribe to that. I say again I do not want to be bound by an engineer's interpretation of this in the absence of a Supreme

Court interpretation, nor do I want to be bound by Governor Johnson's interpretation of it.

Mr. DEXHEIMER. I just want to make clear from a practical standpoint, if there were not 7½ million acre-feet in the river, we could not deliver that much each year.

Senator KUCHEL. The same thing would follow if there were less than 75 million acre-feet in the 10 year period, would it not?

Mr. DEXHEIMER. I think that would be true. However, that is not anticipated. I think there is also provision for sharing.

Senator O'MAHONEY. Mr. Chairman, may I suggest that the worries of the State of California that it will not have sufficient water unless it takes the water which was assigned to the upper basin States by the Colorado River compact are rather in the realm of imagination and not of reality? I am convinced that California will be taking lots of water from the sea by the removal of the salt long before we ever reach the situation which seems to disturb California, and its representatives so much with respect to this project.

May I add, Mr. Chairman, for the benefit of the reporters who are listening, that this is a notable example of a completely bipartisan issue. As Commissioner Dexheimer has set forth in his statement today:

> The upper Colorado River compact was signed in 1948 by the States of the upper Colorado River basin, and that was in compliance with the provisions of the Colorado River compact itself. The Colorado River compact was approved by the Congress and the upper Colorado River compact was also approved by the Congress.

That was on April 6, 1949.

As Commissioner Dexheimer has testified this morning, with that compact as its foundation, the Bureau of Reclamation, and I am quoting now—

> issued in 1950 its report on the Colorado River storage project and participating projects. This report submitted by the Secretary of the Interior to the President on December 4, 1952, presented a plan for the upper Colorado River.

Therefore we have a project for the upper Colorado River storage of this water which was worked out in a previous administration, under the administration of President Truman, by the Bureau of Reclamation, and submitted in 1950 by the Reclamation report.

This report, submitted by the Secretary of the Interior, who was then Oscar Chapman, to the President on December 4, 1952, and since that time the successor President, President Dwight D. Eisenhower, has in his state of the Union message and in other ways indicated his full support of this program. So we have a completely bipartisan project.

Senator WATKINS. Mr. Chairman, the question has been raised about Senator Johnson, now Governor Johnson's interpretation of the Colorado River compact. Assuming that he is right, which of course I do not concede, for the purposes of argument here, it seems to be contended now that the upper basin States can only use water for beneficial consumptive use. They cannot do what has been universally done out West, that is, use water for power that does not interfere with the consumptive use of the water.

The States upstream in order to have sufficient water so they will have some for themselves as well as keep their commitments to the lower basin States, would have to build dams in order to do that.

But having built the dams, it seems to be the contention that they could not possibly make any power from the water which flowed from those dams.

If you concede for the purpose of the argument that is what the compact means, it would certainly not be damaging to California. They would be in a position where there might be an invasion of a technical right without any damages. No court in the world would ever interefere with that sort of situation. That is the ruling universally as I remember it. After all, I do not think California is going to accept the interpretation of Senator Johnson, who is not a lawyer, by the way, but a very able man, because it will be to their detriment to accept any such an interpretation.

Senator BARRETT. Will you yield to me at that point?

Senator WATKINS. I yield.

Senator BARRETT. Do you find anything in the compact that prohibits the use of water for power purposes?

Senator WATKINS. It seemed to be the contention of Senator Johnson we could not use our water except for consumptive use, and the power use is not a consumptive use. I assume we could not take it from the river and run it through transmountain diversions and use it strictly for power and nothing else. You might get that kind of interpretation from it, but not on the main stem of the river where we build the large dams. We are entitled to take some water in central Utah. We take the water over there and we run it down some canyons. If this interpretation of Senator Johnson is correct, then we could not make any power from that water although we take it over there for consumptive use and use every drop of it consumptively.

It is the most absurd argument I have ever heard in connection with the use of water in the arid West.

Senator BARRETT. Will the Senator yield further so I might ask him this question?

Senator WATKINS. I yield.

Senator BARRETT. Is it not true that the compact of 1922 was written at a time when it had been the practice of the Bureau of Reclamation to use the water of the various streams in the West in precisely this fashion and consequently is it not reasonable to assume that the compact was written on the theory that that could and should be done in the upper basin States, particularly so since there is no provision in the compact prohibiting it?

Senator WATKINS. I think that is right.

Senator O'MAHONEY. May I add, Mr. Chairman, to what my colleagues have said that this contention which is said to have been advanced on behalf of California—I do not know exactly whether it has or not—really amounts to an argument that falling water passing through an upper State on its way to California cannot be used to make power. That it must per se be wasted. There is not a line in the Colorado River compact which would sustain any such absurd contention.

Senator KUCHEL. Mr. Chairman, I do not want to take too much of your time now. I want to say I feel a little lonely on this committee.

Senator ANDERSON. We are trying to keep you interested.

Senator KUCHEL. I come here, if I may say to you, Mr. Chairman, and the able men on this committee, desiring to explore just exactly

what the truth is behind this proposed legislation. There are men who are perfectly reasonable who feel that that legislation does constitute a serious hazard to the States of the lower basin. If it does, and if they are right, that ought to be spread out here on the record and be appealing to the members of this committee.

Certainly the problem of water is partisan in no sense whatsoever. I suggested some of the comments of the Governor of Colorado, our former colleague and able Democrat, merely to indicate that these problems are not confined to the Representatives of my State who will testify here on some exceedingly important problems.

I apologize to the chairman if I have raised some legal questions here which should not be answered by an engineer. I say that sincerely, because I would not want the record to indicate what the legal representatives of the Department feel.

Senator ANDERSON. I want to assure the Senator from California that we are not going to stand on technicalities. I just hoped we might be able to get through some of these preliminary statements, because when we get into the argument about what the compact provides, we are in an endless argument that is going to end up before the Supreme Court anyhow, and what we say here will probably have very little effect upon the Supreme Court when it reaches its decision.

Senator GOLDWATER. Mr. Chairman, the questions that have been asked by the Senator from California, 1 of the 3 lower basin States, indicate a concern not shared by my State, namely, whether or not the water will be delivered to the lower basin. My State's concern is to get California to allow Arizona to use her right to share in it. That is all I am concerned with.

I want to discuss with Mr. Dexheimer, Glen Canyon just shortly. Do you know the benchmark for the altitude above sea level of the height of the dam proposed for Glen Canyon?

Mr. DEXHEIMER. 3,715 feet.

Senator GOLDWATER. And the water surface 3,700?

Mr. DEXHEIMER. Yes.

Senator GOLDWATER. Do you recall the mark registered on the benchmark below the natural bridge? Is that not 3,750 feet?

Mr. DEXHEIMER. No, sir. I believe it is below that. We plan to have to build a protective dike to keep the water from one arm of the reservoir from backing up to the bridge.

Senator GOLDWATER. It is my recollection that the benchmark gives 3,750 feet, and that is a little below the base of the bridge itself.

Mr. DEXHEIMER. You are correct, Senator. The elevation at the bottom of the gorge there is 3,654.

Senator GOLDWATER. At the bottom of the gorge?

Mr. DEXHEIMER. Yes, sir. The elevation at the base of the bridge itself is 3,732.97.

Senator GOLDWATER. Then the water that would back up behind Glen Canyon would back up Forbidden Canyon and Bridge Canyon to a point that would not endanger the structure.

Mr. DEXHEIMER. It would not endanger the structure itself, but it would make the access, perhaps, a little less difficult.

Senator GOLDWATER. You said in your statement that—

The dam should be built to the maximum height consistent with economy, the safety of the structure, and adequate protection of the Rainbow Natural Bridge. Our studies indicate that a concrete dam rising 700 feet above bedrock

and 580 feet above the river and creating a reservoir of 26 million acre-feet would meet these criteria.

What are the protections that you plan to take to keep water from getting close to Rainbow Bridge?

Mr. DEXHEIMER. We plan a dike somewhat downstream from the bridge to keep the water from encroaching up in that general area.

Senator GOLDWATER. I wanted to bring that out because there has been a lot of complaint about the proposed construction of Glen Canyon. A lot of it has come from people I am convinced have never studied the actual situation and a lot of it has come from people deeply concerned about the danger to Rainbow Bridge.

You might be interested in these figures, and I think they should be a part of the record. I do not suggest that these are absolutely accurate, but they are approximately so.

Up to 1945, from the time of the bridge's discovery in 1909, there were approximately 3,500 people who had visited that place. That is the number of names on the register below the bridge. Between 1945 and 1951, which was the last time I visited the bridge, almost twice that many people had visited, and do you know how they visited it? By boat. I happen to be concerned in that, because for nearly 20 years I have operated a trail down to the bridge from Rainbow Lodge. We have been put out of business by boats. I am very glad we have, because more people can see it, and I do not have to feed so many mules.

The construction of this dam will actually mean that more people can visit not only Rainbow Bridge, but places like Hole in the Rock, and the other beautiful spots along that stream.

I would like to go one step further in that argument. You will recall that Hoover Dam was built in Black Canyon and that is one of the most beautiful canyons in the lower Colorado Canyon system. Prior to the construction of Hoover Dam, I doubt that more than 500 people had seen that general area in the entire history of the West. Last year 2 million people visited Hoover Dam and the recreational area.

The same thing is going to happen, in my mind, to the area of Glen Canyon, that is now surrounded by about 55,000 square miles of the most desolate country in the United States. The only people that live up there are Indian traders and Indians. It is land that prior to the discovery of uranium was valueless, you might say, except for the scenic beauty to be found up in that area.

I wanted to mention those things and to bring out the actual danger, as you see it, or lack of danger in the construction of this dam, because so many people are going to come before us and say that Rainbow Bridge would be destroyed, when actually we are going to open up Rainbow Bridge and all of those beautiful canyons to people who want to see them.

That is all I have, Mr. Chairman.

Senator ANDERSON. That is a very fine statement, Senator Goldwater. We appreciate it. If there are no additional questions of Mr. Dexheimer, thank you very much for your appearance, Mr. Commissioner.

Mr. DEXHEIMER. Thank you, Mr. Chairman.

Senator ANDERSON. May I say for the benefit of any who are anxious to know what the program is, we are going to try to complete as

many of these statements as we can this morning, maybe running close to 1 o'clock. If we are not able to complete them, we will have to have a session this afternoon because we do want to get these hearings out of the road as rapidly as possible.

Will you state for the record your name and position, Mr. Emmons?

STATEMENT OF GLENN L. EMMONS, COMMISSIONER OF INDIAN AFFAIRS, DEPARTMENT OF THE INTERIOR

Mr. EMMONS. Glenn L. Emmons, Commissioner, Bureau of Indian Affairs.

Senator ANDERSON. You may proceed.

Mr. EMMONS. Mr. Chairman and members of the committee, I appreciate the opportunity to appear here today and make some comments about the Navaho Dam and irrigation project which is included as a part of the program proposed in S. 500.

As some of you may know, I have spent practically all of my adult life, up until August 1953, practically on the border of the Navaho Reservation, and I have a deep personal interest as well as an official interest in the welfare of these people.

The proposal to develop a large irrigable acreage south of the San Juan River was actually initiated in the early 1900's. Ever since that time the people of northwestern New Mexico, both Indian and non-Indian, have been looking to the day when this great project would become a reality.

The Bureau of Indian Affairs has prepared a "feasibility report" covering the Navaho project, which breaks down into the Shiprock and San Juan division. This report has just been submitted to the Department for review and has not yet been distributed to other agencies of Government and the States as required by law.

Others here will testify on behalf of the Department and the Bureau on the technical engineering and economic aspects of the proposal. My primary purpose is to bring out some of the more human considerations which I believe are fundamentally important. More specifically, I want to emphasize how tremendously desirable I think this project would be in terms of the future welfare of the Navaho Indian people.

First, I would like to put the Navaho project in the framework of the total program to help the Navaho people in solving their more urgent problems. The distressing poverty which prevails among the Navaho people today is primarily an outgrowth of the lack of balance between the rapidly increasing population (which now numbers around 75,000) and the resources upon which they depend for support. As the population has expanded, the basic standard of living has declined. This central problem was recognized by the departmental report of March 1948, which led to the enactment of the Navaho-Hopi Rehabilitation Act of 1950. In that act there is at the very least a strong implication that construction of the Navaho project is an indispensable element in any sound approach to a solution of the total Navaho problem. The act provided an authorization of $9 million for reservation irrigation projects and for study of the Shiprock (or, as it is now called, the Navaho) project.

At this point, however, I want to emphasize that in dealing with the complex and many-sided problem of the Navaho people, we are not

relying on any one line of approach. As you all know, we recognize the fundamental importance of education and, through our Navaho emergency education program, we have provided schooling this year for more than 8,000 additional Navaho children who had never previously seen the inside of a classroom. We are emphasizing adult training and helping in the relocation of those who want to move off the reservation in search of better job opportunities. We are, in every possible way, encouraging the development of industry and business and thus opening the way to increased Navaho employment in the immediate area.

Frankly, I do not see how, basically and in the long run, we can hope to solve the Navaho problem, without the Navaho project. In placing 1,110 Navaho families on the proposed project, we foresee several primary and secondary results. Another 2,220 families will find employment in service and other activities. This means that a total of approximately 18,000 Navaho men, women and children, in addition to 2,000 non-Indians, would be direct beneficiaries of the project. The indirect benefits would be even more far-reaching. Present pressure of overuse of the Ravaho Reservation range would be substantially relieved. Schools for this population (farmers and nonfarmers alike) could be built on a day-school basis instead of the expensive boarding school basis on which we are forced now to operate. Every social service to which the Navahos located on or near the project are entitled could be more efficiently and economically administered. I foresee that the Navaho project would have profound, far-reaching, permanent, and expanding influence in helping the tribe find some economic stability.

The Navaho Tribe, as you know, is the biggest one in the country. Its problems, as a whole, represent the biggest single complex of Indian problems with which the Congress and the Bureau have to deal. We have all been acutely aware of this fact that great blizzard of a few years ago which swept the Navahos onto the front pages of the national press. National interest in the Navaho has remained constant, as I can well attest since I came to Washington. If we can, with the support of the Navaho people themselves, set this fine group of people on the road to economic self-sufficiency, we will be meeting the expressed wishes of the American people. In this task, as I have said, the construction of the Navaho project is an indispensable feature, because it represents the largest and most feasible economic potential in the entire distressed area.

I urge you to consider the factor of cost in a broad framework. I do not know how many millions of dollars have been spent over the years, not only in meeting the basic human needs of the recurring crises in Navaholand, but in carrying the essential services of welfare and administration. As I said earlier, I have lived intimately close to this situation for years. I know that the total cost expended by the Federal Government must have run to a gigantic figure.

The question I would raise is whether it may not be better to make the kind of investment which is here proposed rather than to go on as we have in the past?

There is more involved here than cost, that is, the human need of the Navaho people, and something more—the obligation of the United States to assist the tribe in the utilization of the waters of the San Juan. From every point of view, I believe it is far better to invest in

Navaho economic rehabilitation than in Navaho relief, in permanent stability than in the present ever-worsening instability and frustration. The Navaho project offers us the best and largest opportunity of striking out in that direction.

One important question that needs to be faced, of course, is whether the Navaho people can and will farm the land productively once it is developed. For an answer, we have two things to go on—our past experience and the training plans we had in mind for the Navaho before they go onto this project—if it is constructed.

Let me mention first our past experience.

As you fly into Farmington, N. Mex., after passing over the dry eroded area to the south, you see a ribbon of green all along the San Juan River. This, in other words, is a prosperous valley. It was a prosperous valley even before the recent coming of gas and oil development, uranium mining and processing, and helium production in the area. Some Navaho Indians have had real experience with irrigation on the Fruitland and Hogback projects and are contributing substantially to the agricultural production of the valley.

Avoiding the temptation to be overoptimistic, it can be said that the two Navaho irrigation projects—Fruitland and Hogback—are producing anually more than $300,000 worth of crops from a total of 7,669 acres. Both projects are seriously handicapped because of the small acreages allotted to the Navaho families—11 acres on the Fruitland, and 7½ acres on the Hogback. The reason we have such farm acreages is because of decisions made some years ago to crowd as many Navaho families on the land as possible on a subsistence basis. This scheme has not worked, because the Navaho irrigationists have had to neglect their farms to seek transitory labor. Nevertheless, on the Fruitland project 93½ percent of the land is in use and only 6½ percent idle. This compares with the usual experience of 10 percent idle land on Bureau of Reclamation projects. On the Hogback project, the idle acreage is a little over 20 percent—due directly, I believe, to the almost impossibly small 7½-acre farm units. With the construction of the new Navaho project it will be possible for us to enlarge the farm units on these two projects. Our experience, however, in spite of the heavy handicap that I have indicated, proves that the Navaho Indian can and will become an irrigation farmer, as he is now doing with more success than we could reasonably expect under the circumstances, raising alfalfa, corn, beans, small grains, fruit, and garden vegetables.

Turning to the training and preparation of Navahos for resettlement on the proposed project, it is clear that we must have Navaho operators prepared to use the land properly when this great project is completed. Navahos will be eagerly waiting for the opportunity to move onto this land; but more important, they must know how to operate and manage an irrigated farm unit. We cannot expect Navaho herders to successfully make the transition from sheepherding over desert acres to farmers on irrigated land without giving them first the opportunity to retool their thinking and skills in preparation for this change. It is of utmost importance, therefore, that we anticipate this need and provide as a corollary to this project a well planned educational training program to give Navahos the know-how to use the land when it is ready.

Anticipating this need for trained operators, we have prepared the blueprints of an education training program that will be geared both directly and indirectly to this project. The training program objectives are threefold:

1. Eradicate illiteracy and raise the general educational level of the Navaho people.

2. Carry out a well-planned adult training program in the practices and techniques of irrigated farming for Navaho adults interested in locating on irrigated land.

3. Prepare future operators through high-school programs of vocational agriculture.

A goodly number of the first occupants of this land will be Navaho adults who will receive assignments. These adults for the most part will have had no previous experience in this type of farming. We have planned an intensive adult education program for these future farmers—a program which we hope to carry out by using Indian land on the Fruitland and Hogback projects and school farms as laboratories for the demonstration and practice of effective forming techniques. We plan to seek the cooperation of State and local agencies, agricultural colleges, extension agents, and soil scientists in carrying out such a program. We are already doing this type of cooperative education in a limited way at our Stewart Agency in Nevada.

Finally, I would like to mention the possibilities for future economic development which I can visualize in the entire San Juan Valley area above Shiprock. It promises to become one of the really balanced economic areas—industrially and agriculturally—in the whole Southwest.

I have mentioned the past, though modest, success of irrigation farming based on the use of the waters of the San Juan. In recent years, we have seen the vast and important development of gas deposits. We have seen the area intimately linked with the extraction of uranium on the Navaho Reservation. We have seen the construction of a uranium processing mill and testing plant and the reactivation of the helium processing plant at Shiprock. We know that private industry is working toward the development of the great coal deposits near the area. Construction of homes has kept abreast of the growing population. The Navaho tribe built a motel at Shiprock; it is full every night and will have to be enlarged.

The area is richly endowed. It is coming into its own. It has natural energy in its coal and gas resources. It has manpower in its Navaho people. It has water in the San Juan River.

The Navaho dam and irrigation project, if built, will give vast and growing impetus to the whole economic life of northwestern New Mexico.

For centuries, the Navahos have lived along the San Juan River. To them, it is "our river," yet they have been most reasonable and practical in recognizing the needs of the Rio Grande Valley, and they have shown a willingness to work cooperatively with the State of New Mexico in developing a broad plan for the use of the unused waters of the San Juan.

The decision is in the hands of the Congress. In these remarks I have emphasized the indispensable place which the Navaho project has in the solution of the Navaho problem, a broad perspective on the

matter of construction costs, the past experience of Navahos in irrigation farming in the San Juan Valley, our planning for training and preparing Navahos for resettlement, and the developing economy of the San Juan Valley, which needs the project and can benefit most effectively from its construction. I earnestly hope that all these matters will have your most thoughtful consideration.

Senator ANDERSON. Thank you, Mr. Commissioner. I want to congratulate you on your continued, fine, and intelligent interest in behalf of the Navaho Indians. I appreciate the fine things you have done.

Are there questions?

Senator WATKINS. I would like to ask the Commissioner one question.

As a practical matter, Commissioner, it is absolutely necessary, is it not, for the Indians to cooperate with the white people in the construction of this overall project in order to have one built at all for them?

Mr. EMMONS. That is right.

Senator WATKINS. There is no other means except an enormous cost of getting them the water independently from the upper Colorado River?

Mr. EMMONS. That is right, sir.

Senator KUCHEL. Mr. Emmons, what is the present view of your office respecting the rights of Indians to water on the Colorado River?

Mr. EMMONS. Senator, first and foremost, I am interested in the rights established by treaties for the Indians—all Indians of the country. I believe that the Indians' requirements should be considered primarily.

On this matter, however, the Indians, the same as they have in most other places, have been practical and have indicated just what their absolute requirements might be.

Senator KUCHEL. Does your office have a firm position with respect to any priorities on the rights of Indians to Colorado River water?

Mr. EMMONS. I do not believe I am prepared to answer that, Senator.

Senator ANDERSON. May I interrupt and say that Elmer Bennett, the legislative counsel for the Department of Interior is here. I believe he has been authorized by the Secretary to answer legal questions. If at any time you desire to have that answered by him, and the Senator from California is willing, I would appreciate Mr. Bennett stepping forward and answering.

Mr. BENNETT. As I think the members of the committee are well aware, the issues connected with the priorities of Indian water rights are pending before the Supreme Court in the litigation between California and Arizona. The position, however, of the Department with respect to the project which this committee has before it is quite simply this:

Early this morning there was a tabulation of the present uses of water in the upper basin. To that was added a figure of a million acre-feet if the Department's recommended project before this committee is authorized. As I understand it, the bill itself would add another 800,000 acre-feet of water to the uses in the upper basin. The total, as compared with the 7½ million acre-feet apportionment to the upper basin, in our judgment renders the question of the substance and the quantity of Indian rights, as contended for in the pleadings of the United States, immaterial in the consideration of this bill.

Senator WATKINS. I would like to ask this question. As a practical matter, the Indians would not be able to get the water out of the Colorado River to use even if they owned it all or if they had a prior right to all of it without help. In order to make practical use of it, they would have to enter into a project of this kind.

Mr. BENNETT. That, I think, is fundamentally a policy question which the Congress itself would in the end be in a position to resolve. It is quite true, I think, that the Indian claims would be paper claims unless the United States proceeded to assist the Indians in making all or a part of those claims good by actual application of the water.

The bill before the committee is a very major step in that direction inasmuch as it would authorize the Navaho project.

We are not in a position at this time to recommend outright authorization inasmuch as the statutory steps have not been completed for the processing and submission of the project plan. Nevertheless, we know that there are Indian water rights which will be served through some of the other projects which are included in the bill.

For example, the Pine River extension project in Colorado. These are illustrations of the good faith of the United States in attempting to provide an economic use of water by the Indians under circumstances where the policies of the United States would permit that to be done.

Senator WATKINS. I also call your attention to the fact that in northeastern Utah, on the former Ute Indian Reservation, the Indian water rights can be made much firmer than they are now by the development that is proposed under this project. At least under the participating project known as the Central Utah.

Mr. BENNETT. That is what I understand, Senator.

Senator O'MAHONEY. Mr. Chairman, just a simple question. On what do these Indian claims depend?

Mr. BENNETT. Of course, the basis for them is set forth in very brief form in the pleadings before the Supreme Court. Fundamentally, the issue seems to turn on the meaning of the Supreme Court decision, *Winters* v. *the United States*. That opinion is the subject matter of a good deal of academic legal discussion by much wiser attorneys than I ever would pretend to be, sir.

Senator O'MAHONEY. Is there a treaty claim?

Mr. BENNETT. In some instances, yes. In others it is not necessarily a treaty claim. It depends on the interpretations put on the Winters doctrine which seems to stem as much from the action of the United States in creating the reservation of the land for the benefit of the Indians as it did from treaty rights.

Senator O'MAHONEY. Is there any question about it in anybody's mind that whatever water rights the Indians claim or should have cannot be exercised unless a project of this kind is built by the United States?

Mr. BENNETT. I think our engineers would be better qualified to answer that, but it is my understanding that that is quite true. There may be some portion of these water rights that could be used by direct diversion from the stream. For example, perhaps the Colorado River reservation. However, I am not familiar with the engineering situation or the physical facts.

Senator O'MAHONEY. I was merely trying to get the legal situation from your point of view.

Senator WATKINS. It seems to me from my experience with engineers from the Bureau of Reclamation they were helping me out with the legal problems all the time, and I never overlooked an opportunity to tell them how to do the engineering.

Senator KUCHEL. Do I understand you to say, Mr. Bennett, that the Attorney General in the *Arizona* v. *California* lawsuit has taken the position that the rights of Indians to water in the Colorado River is immaterial?

Mr. BENNETT. No, I did not say that. I said that the question of the Indian claims to water, under the situation involved in the bill before this committee, is immaterial to the question whether this bill should be enacted. I did not say that the pleading by the Attorney General was immaterial in the litigation, which it certainly was not.

Senator KUCHEL. Does the Attorney General take a position on the rights of Indians to water on the Colorado River?

Mr. BENNETT. He has taken a position. I am not sufficiently informed to interpret what that position before the Supreme Court will be when the suit is actually tried.

Senator KUCHEL. What can you state is the position of the legal staff advising the Office of Indian Affairs with respect to the rights of Indians to Colorado River water?

Mr. BENNETT. I am not fully familiar with that, Senator. The question, as far as this legislation is concerned, turns solely on whether the cushion, let us say, between the uses in the upper basin, which are contemplated by the legislation before this committee, would allow a safety margin to absorb whatever additional burden, if any, might be laid on the upper basin in order to meet Indian demands.

Senator KUCHEL. Aside from the inclusion in this bill of the Navaho project, is there any other policy decision on Indian rights included in this bill?

Mr. BENNETT. Not that I can think of at the moment, Senator.

Senator KUCHEL. Does the Department have any recommendations for the committee respecting any amendments along those lines?

Mr. BENNETT. Not to my knowledge, Senator. I do not believe that any such amendments has been considered at the Department.

Senator KUCHEL. Would it be fair, then, to say that the Office of Indian Affairs takes no position on the rights of Indians or the priorities of Indian rights to Colorado River water?

Mr. BENNETT. No, I would not say that. I am certain that they will provide much of the testimony and the technical record upon which the Supreme Court will resolve these issues.

Senator KUCHEL. But for the purpose of enlightening the committee on the proposed bill, I would ask again if the Office of Indian Affairs could indicate its policy decision or its legal position on the rights of Indians to water and the priorities.

Mr. BENNETT. That is under very careful study at the present time. I am certain that the eventual outcome with respect to the position of the Interior Department vis-a-vis the interpretations of the Winters case and the other related issues will have some impact on the ultimate position of the United States before the Supreme Court, but I am not aware of any final decision having been made in the Department, either policywise or with respect to the legal position that will be taken before the Court.

Senator KUCHEL. Are you aware of the position which the Attorney General of the United States may have taken on that same question in this lawsuit?

Mr. BENNETT. In a very general way, yes.

Senator KUCHEL. What in a general way is his position?

Mr. BENNETT. That would depend a good deal on how you interpret his pleadings, but as I personally—and without speaking, let us say, in terms of defining what his real meaning was—would say that it alleges certain Indian claims as a first charge against the stream.

Senator KUCHEL. If his contention prevailed in the *Arizona* v. *California* lawsuit, would such a ruling affect the feasibility of all or any part of the projects in S. 500?

Mr. BENNETT. Our answer to that is an unqualified "No," Senator.

Senator KUCHEL. So in your judgment S. 500 is not concerned with any paramount rights or priorities which Indians might have.

Mr. BENNETT. Not in terms of affecting the feasibility of projects which would be authorized in the bill before the committee, Senator.

Senator KUCHEL. Do you have any figures or does the office have any figures which would indicate why your answer is "No"?

Mr. BENNETT. I think the engineers could point this out, but let us start from the beginning and then you can follow that through when the engineers are before you. There are engineers here to speak for the Bureau of Indian Affairs.

To begin with, the quantity which is stated in the pleading of the United States is, I believe, 1,700,000 acre-feet of water. I believe the engineers can give you some information with respect to the meaning of that 1,700,000 acre-foot figure.

But as I said before, with the cushion of 3 or 3½ million acre-feet of apportionment, in the view of the Department, the figure in the pleadings would be meaningless in terms of the questions involved in the enactment of this legislation.

Senator ANDERSON. Will you permit me to ask one question?

Senator KUCHEL. Yes.

Senator ANDERSON. Is it not true that in the New Mexico situation where the Navahos are involved that if you take the New Mexico allotment of some 11 percent and figure it down to the 800,000 feet that the State would get, if the Navaho project were included, they would be receiving three-fourths of all the water coming into the State? So the Navaho would seem to be pretty well protected in the determination to distribute the water in that fashion.

Mr. BENNETT. I would not have those figures at hand myself, but I am sure there are those in our group who would be happy to put those figures before the committee.

Senator KUCHEL. Just one further question for the record. I refer to one short paragraph in the hearings of last year at page 290 in which Judge Breitenstein was testifying and he said in part:

> It is true that in the pending suit of *Arizona* v. *California* there is an issue as to the method of charging Indian uses of water. This does not concern the upper basin. The omission in the 1922 compact of any provision for the charging of uses of water by the United States or its wards has been supplied so far as the upper basin is concerned, by the 1948 compact.
>
> A California spokesman in the House hearings on this project has stated that the Bureau of Indian Affairs has construed the compact as meaning that the Indian claims in effect are prior and constitute the first demand upon the water supply. If such a theory should be upheld, then every right to the use

of water of the Colorado River and its tributaries is of doubtful validity. It is inconceivable that the United States as the guardian of the Indians will ever assert that the rights of the Indians come ahead of the use of water on the great reclamation projects which the United States has constructed on the Colorado River, such as Hoover Dam, the All-American Canal, the Salt River project, the Gila project, the Colorado-Big Thompson project, and many others.

That is all.

Senator ANDERSON. If there are no further questions, thank you very much, Mr. Emmons.

Mr. EMMONS. Thank you.

Senator ANDERSON. The next witness is Mr. Will. Do you have a prepared statement?

Mr. WILL. I do not, Mr. Chairman. I had prepared a brief statement, but the circumstances have changed somewhat since that statement was prepared. I will take only about 5 minutes, and if I might proceed without a prepared statement, I would be greatly obliged.

Senator ANDERSON. You may do so, surely.

STATEMENT OF JOHN GEOFFREY WILL, SECRETARY AND GENERAL COUNSEL, UPPER COLORADO RIVER COMMITTEE

Mr. WILL. I want to express on behalf of the Commission our deep appreciation to you, Mr. Chairman, and to the members of this subcommittee for the arrangements that have been made to hear us early so soon after the convening of the hearings.

We presented last year, as you said this morning, Mr. Chairman, I think a rather full case for the authorization of the Colorado River storage project and participating projects. We bear in mind the hope that was expressed in our press release of February 5, that the hearing might be confined so far as possible to new material.

Accordingly, so far as the Commission itself is concerned, we do not propose to offer any testimony in addition to that which we adduced during the course of the hearings in the 83d Congress.

I hope, Mr. Chairman, that at some appropriate time your subcommittee will take whatever action is needed to incorporate by reference only into these hearings the printed hearings of the committee during the 83d Congress on S. 1555.

Senator ANDERSON. Without objection we will take that action right now, because I think that is desirable and they will be incorporated by reference into the hearings of this session.

(The printed hearings of the subcommittee are incorporated by reference.)

Mr. WILL. I understand, Mr. Chairman, that there will be offered to the subcommittee in due course, today or tomorrow, certain supplemental material in regard to the Navaho participating project. I think there will be some representatives of the Navaho Tribal Council here, and certain supplemental material regarding the San Juan-Chama project. I understood Mr. Mutz is here and will offer some testimony in connection with that project.

I understand further that Mr. Clifford H. Jex, an engineer from Grand Junction, Colo., will have some testimony to offer to the committee in connection with certain of the additional participating projects which the Commission commended to the consideration of Congress at the Commission's special meeting of January 8 in Denver.

Senator ANDERSON. May I say to you that he is scheduled to be a witness tomorrow morning, and we hope that he, along with Governor Johnson and Mr. Crawford and others, will put those proposed projects clearly before the committee at that time. He will be a witness.

Mr. WILL. That, then, Mr. Chairman, concludes what I had proposed to say to the subcommittee. As you see, we are trying to accommodate ourselves very fully to the wishes you expressed on February 5.

Senator ANDERSON. You are very kind, Mr. Will, and I appreciate it.

Mr. WILL. Thank you.

Senator ANDERSON. Mr. Larson, I believe, is the next witness. Mr. Larson, would you rather start fresh at 2 o'clock? How long will your testimony be?

Mr. LARSON. I might explain it, and then you can decide what you wish me to do.

Senator ANDERSON. I think in view of all the circumstances, we will recess until 2 o'clock.

(Thereupon at 12:30 p. m., a recess was taken until 2 p. m., the same day.)

AFTER RECESS

Senator O'MAHONEY (presiding). The committee will come to order, please.

The next witness is Mr. E. O. Larson from Salt Lake City. You are the head of the Bureau in that area, are you not?

STATEMENT OF E. O. LARSON, REGIONAL DIRECTOR, BUREAU OF RECLAMATION, REGION 4, SALT LAKE CITY, UTAH

Mr. LARSON. I am regional director of the Bureau of Reclamation, region 4, with headquarters at Salt Lake City.

Senator O'MAHONEY. And you are very familiar with this controversial project?

Mr. LARSON. I am, yes.

Senator O'MAHONEY. Very well. The committee will be glad to hear you.

Mr. LARSON. Mr. Chairman, I would first like to express my appreciation for the opportunity of appearing before you. I have a statement requiring about 30 to 35 minutes to read, and I assume you do not wish me to read it, but I can explain what is in my entire statement, the papers attached, and then by ready for questioning.

Senator O'MAHONEY. Unless there is some objection by some member of the committee, we will allow you to proceed in the manner you have indicated. You may summarize your statement. It will be printed in its entirety in the record. Questions, when the time comes for questioning, may be directed to any part of it.

Senator WATKINS. May I ask, Mr. Chairman, if it is not going to be read, that we permit it to be printed with the large type?

Senator O'MAHONEY. Without objection, it is so ordered.

Mr. LARSON. In addition to the 2 storage units and 11 participating projects recommended for initial authorization by the Secretary of the Interior, the legislation, S. 500, before you contains 2 other storage units and 3 other participating projects. I will first discuss the items recommended by the Secretary and then present material now available

on the additional units and projects in the bill. The investigation of two of the additional participating projects has not been under my administrative jurisdiction. I suggest, therefore, that questions concerning the Indian features of the Navaho project be referred to the Bureau of Indian Affairs, and likewise a representative of region 5 of the Bureau of Reclamation will answer questions concerning the San Juan-Chama project.

The Secretary's proposals would authorize construction of 2 storage reservoirs, Echo Park and Glen Canyon, with a total capacity of 32½ million acre-feet. Besides regulating the flow of the river, these units would generate power needed by the upper basin States and provide sediment control for the lower basin.

Construction of the 11 recommended participating projects would constitute a material advance in the development of the upper basin water resources. They would bring 132,360 acres of land into agricultural production and provide supplemental water to 233,930 acres of land now irrigated with an inadequate water supply. They would also supply industrial and municipal water and hydroelectric energy.

The Echo Park and Glen Canyon units of the storage project are part of the plan for regulation of the upper Colorado River through which the provisions of the Colorado River compact can be met and additional use of apportioned waters can be made in the upper basin.

The basin plan would eventually comprise a system of seven large regulatory reservoirs located at strategic points of control on the main stem and major tributaries of the upper Colorado River. At each of the seven storage sites a powerplant would be constructed for the generation of hydroelectric energy. Two additional power plants with small re-regulating reservoirs that would utilize upstream regulation, would complete the integrated storage and power system of the plan. The Secretary, however, recommends initial construction of only two of these power and storage units and has selected the Echo Park and Glen Canyon units because of their economy and efficiency.

Although the regulatory reservoirs proposed in the basin plan are generally below the points of diversion for the participating projects, they would serve essentially the same purposes as reservoirs above points of diversion. This would be achieved through a replacement practice quite common on western streams where water is diverted upstream in exchange for storage water releases from downstream reservoirs. In this manner the downstream obligations would be met. It would be impossible and there is no necessity to provide this replacement through reservoirs at the sites of the participating projects. Selection of a few large reservoirs would also facilitate the integrated operation of the system, which would be necessary in order to provide river regulation, water for consumptive use and generate the optimum amount of hydroelectric power from the system's water as it is released to meet downstream obligations.

Optimum production of power at the Glen Canyon and Echo Park units would be assured by the construction of interconnecting transmission lines. These interconnecting facilities would permit maximum flexibility in power operation and facilitate the delivery of Glen Canyon power to load centers in the upper basin States. The initial lines would be the backbone of the transmission grid to which subsequently constructed powerplants would be added. Supply lines from the transmission grid would be constructed to serve local market areas.

Ten major private power companies support this project and propose to absorb the project power output from a main transmission system and deliver it to existing and prospective customers. This would relieve the Federal Government of a portion of its contemplated construction cost.

Glen Canyon Dam would be on the Colorado River in northern Arizona approximately 13 miles downstream from the Utah-Arizona border and 16 miles upstream from Lee Ferry. The dam would be a concrete structure rising 700 feet from bedrock and 580 feet above the river. The reservoir would offer final regulation for deliveries of water at Lee Ferry in compliance with the Colorado River compact. Out of a total capacity of 26 million acre-feet, 20 million acre-feet would initially be active capacity. The reservoir when filled would have a normal water surface area of 153,000 acres and would extend about 186 miles up the Colorado River, nearly to the mouth of the Green River, and 71 miles up the San Juan River. It would be the principal point of sediment control in the upper basin. Even after 200 years, at the present rate of sediment flow and with upstream storage developed, almost half the initial storage space would be available for river regulation.

A powerplant would be located near the toe of Glen Canyon Dam. It would consist of 7 generating units with a total installed capacity of about 800,000 kilowatts or approximately one-half the total capacity contemplated for the entire Colorado River storage project.

The total construction cost of the Glen Canyon unit, with an appropriate share of transmission costs, is estimated at $421 million. Also provided in the proposed bill of authorization would be the construction facilities for adequate protection of the Rainbow Natural Bridge.

Echo Park Dam would be located in Colorado on the Green River about 3 miles east of the Utah-Colorado State line and 3 miles below the junction of the Green and the Yampa Rivers in the tri-corner area of Colorado, Wyoming, and Utah. The dam would be a concrete structure rising 690 feet from bedrock and 525 feet above the river. The reservoir would have a storage capacity of 6,460,000 acre-feet, including 5,460,000 acre-feet of active capacity. When filled to capacity, the reservoir would have a surface area of 43,400 acres and would extend 63 miles up the Green River and 44 miles up the Yampa River.

The powerplant at the dam would consist of 4 generating units with a total capacity of about 200,000 kilowatts.

The construction cost of the Echo Park unit is estimated at $176 million including an appropriate part of the basic transmission system but not including recreational development of the Dinosaur National Monument estimated to cost $21 million.

A participating project is defined as any water-consuming project which would utilize water of the upper Colorado River system for irrigation and require repayment assistance on irrigation costs from power revenues of the storage project.

The following 11 such participating projects are recommended for initial authorization in the Secretary's supplemental report.

LaBarge, Wyo.
Seedskadee, Wyo.
Lyman, Wyo.
Silt, Colo.

Smith Fork, Colo.
Paonia, Colo. (including Minnesota unit).
Florida, Colo.
Pine River extension, Colorado-New Mexico.
Emery County, Utah.
Central Utah (initial phase), Utah.
Hammond, N. Mex.

Brief statements on each of the initial participating projects are attached for filing with your committee, and further details can be found in the supplements to the Colorado River storage project report (H. Doc. 364, 83d Cong., 2d sess.).

A 12th project, the Eden project in Wyoming, was authorized in 1949 and is now under construction. That authorization provided that the project be assisted in repayment by power revenues from the Colorado River storage project. The Eden project is therefore included in the plan as a participating project.

The Secretary's supplemental report also included the Shiprock division of the Navaho project. Subsequent studies show that major features of the Navaho project, including the Navaho Reservoir, would be used jointly by the two divisions of the project. The Navaho Reservoir would also be used by the potential San Juan-Chama project. Thus, the Navaho project would be uneconomical of construction by divisions, and authorization of only the Shiprock division of the project would therefore be unsound. For the information of your committee, however, a brief summary on the overall Navaho project prepared by the Bureau of Indian Affairs is attached. Further details on this project can be found in the feasibility report, Navaho Project, New Mexico, January 1955, compiled by the Bureau of Indian Affairs.

The Colorado River compact in article III (a) apportioned from the Colorado River system in perpetuity to the upper basin and lower basin, respectively, exclusive consumptive use of 7½ million acre-feet per annum. There is a provision in article IIId of the same compact that the States of the upper division (Colorado, New Mexico, Utah, and Wyoming) will not cause the flow of the river at Lee Ferry, the point of division between the upper and lower basins, to be depleted below an aggregate of 75 million acre-feet for any period of 10 consecutive years. These are the controlling and most important limitations with respect to water uses in the upper basin although there are other provisions in the compact relating to uses and deliveries of water.

Substantial water development in the upper basin is impossible without regulation of the uneven flow of the Colorado River. Our studies show that without such control only about 58 percent of the water apportioned to the upper basin could be used.

During the past 59 years, the historic annual flow of the Colorado River from the upper basin has varied from a high of 22 million acre-feet in 1907 to less than 5 million acre-feet in 1934. That span of years also presented extended periods of abnormal and subnormal flows, the most impressive being the extremely high flows of the period 1914 to 1929 with historic annual flows averaging over 16 million acre-feet and the prolonged 25-year drought following thereafter with historic annual flows averaging only 11.5 million acre-feet. The long-time average flow, however, including periods of high runoff and

drought, is sufficient to supply the allocated consumptive uses in the upper basin in addition to the downstream obligations. The primary function of the storage units in the plan is to store water during years of high runoff for release during years of low runoff. Therefore, these cyclic conditions must be recognized in planning future uses of water in the upper basin.

A history of 59 years of river operation may or may not have revealed the full characteristics of the Colorado River. Yet an initial development of the magnitude now proposed has the assurance of the availability of sufficient water supply. Later stages of development would derive additional assurances as time goes on, or, if changes are required, time will permit appropriate adjustments in the later stages of development.

Under sound engineering and economic practices it would be impractical to completely regulate past historic flows of the river and its tributaries and in years of extreme drought conditions the users of upper basin water would experience shortages in their supply. In analyzing the upper basin's long-time program for developing its apportioned use of 7½ million acre-feet per annum, we found that such occasional shortages should be within the limits of normal irrigation, industrial, and municipal operations.

The initial storage-project units would provide for a greater amount of replacement storage than would be needed to permit the increase in consumptive use which would result from the initial development. However, these large storage facilities would develop the optimum power potential of these sites necessary to meet the demands of the region. These large power and storage units would also fit into any subsequent phase of the upper basin development which may be authorized.

A start on the required storage facilities in advance of their actual need is imperative because of the time element involved in the construction and initial filling of the storage reservoirs. Apportioned water not presently consumed in the upper basin would greatly facilitate the initial filling of the reservoirs.

Through electrical interconnection between Glen Canyon, Echo Park and existing powerplants in the lower basin a first filling of the storage reservoirs could be attained with no interruption in delivery of firm electric energy to existing and potential customers on the river's system.

The time required to initially fill the Glen Canyon and Echo Park reservoirs will largely depend upon the amount of runoff in the river. Under very favorable runoff conditions the filling period could be less than 5 years whereas a much longer period would be necessary under extreme drought conditions. In either event, however, dead storage levels at Glen Canyon and at Echo Park could be attained during the period of construction of the dams, thereby providing the heads necessary for initial power generation.

Since the initial participating projects do not require the full capacity of Glen Canyon and Echo Park Reservoirs for regulatory purposes, there would be no immediate need to completely fill these reservoirs. Thus the initial filling process can be readily adapted to the amount of runoff and downstream demands for water and firm electric energy. This initial filling process would not violate the terms of the Colorado River compact.

The total consumptive use of water in the upper basin by all constructed projects, those authorized and projects under construction will be approximately 2½ million acre-feet, or one-third of the annual allotment of 7½ million acre-feet to the upper basin.

The 11 participating projects recommended in the Secretary's supplemental report would increase present stream depletion by an additional 400,900 acre-feet annually. Average evaporation from the recommended Echo Park and Glen Canyon storage units would amount to about 613,000 acre-feet annually. The units and projects recommended for authorization would thus involve an increased use of approximately 1 million acre-feet per annum. With accelerated development in the future the remainder (4 million acre-feet per annum) of the upper basin's share of the Colorado River water may be put to beneficial use within the next 75 years.

Our studies show that the recommended units and projects would have no material effect on the quality of water downstream.

With respect to later phases of development, the plan provides for additional gaging and sampling stations to supply data for continued analysis and scrutiny as each phase approaches authorization. Our analysis of the quality of water at Lee Ferry reveals for the critical period of low flow (1931 to 1947) concentrations of dissolved salts averaging 0.78 ton per acre-foot (575 parts per minute), corresponding to uses totaling 2½ million acre-feet per annum in the upper basin.

An average concentration of 0.85 ton per acre-foot (625 parts per minute) or an increase of about 9 percent is anticipated at Lee Ferry following completion of the recommended Glen Canyon and Echo Park storage units and the 11 initial participating projects, with a corresponding use then totaling about 3½ million acre-feet. With full use of the 7½ million acre-feet per annum allotment in the upper basin, the average concentration of dissolved salts at Lee Ferry is estimated at about 1.20 tons per acre-foot (880 parts per minute).

Under any of the above conditions, concentrations and type of salts are well within the standard range for irrigation water designated by the United States Salinity Laboratory at Riverside, Calif., as good to permissible, and within the range of practical treatment for municipal and industrial purposes.

The total construction cost of the initial units and participating projects is estimated at $930 million as summarized in table I.

This cost includes $7,287,000 for the authorized Eden project now nearing completion, $2,035,000 expended on the Paonia project under a previous authorization, and $21 million proposed for recreational development of the Dinosaur National Monument. This cost is based on January 1953 price levels, and if adjusted to October 1954 price levels would be reduced by about 1 percent.

Also included is the cost of a transmission system necessary to deliver electrical energy to power market centers in the upper basin States and to tie in with the lower basin system.

If the Federal Government constructs only the interconnecting trunkline, with the remainder of the system to be constructed by non-Federal interests, the estimated Federal construction cost would be reduced and the purchase price for project power to those non-Federal interests decreased.

Costs of the two initial units of the storage project have been allocated to power, irrigation, and recreation. The costs of the participating projects have been allocated primarily to irrigation.

Costs allocated to recreation represent only the added cost resulting from the inclusion of recreational facilities. The allocation of costs will be subject to further study in connection with preparation of definite plans. The costs as presently allocated on a preliminary basis are presented in table I.

The reimbursable construction costs of each unit and participating project would be repaid within 50 years of the time that unit or project is completed, exclusive of authorized development periods. Commercial power and municipal and industrial water supply investments would be repaid with interest at the going rate for long-term marketable securities. Interest-bearing and non-interest-bearing investments would be paid concurrently to the extent practicable. Repayment of the irrigation investment would be accomplished during a 50-year period with the irrigators paying up to their ability and the balance paid by the application of excess power revenues from the storage project during the same 50-year period.

Exceptions to this are the Paonia and Eden participating projects for which special legislative provision has already been made, and those cases involving Indian lands to which the provisions of appropriate acts—the Leavitt Act—would be made applicable by the terms of the bill.

The cost of the recreational planning and construction program of the National Park Service in the Dinosaur National Monument would be nonreimbursable.

At a 6-mill per kilowatt-hour average firm power rate, power revenues would be sufficient during 50 years of operation to repay the costs allocated to power at the Echo Park and Glen Canyon units and central Utah project, with 2½ percent interest on the unpaid balance, and also to make substantial payments on irrigation costs. Thereafter power revenues would be sufficient to complete repayment of the non-interest-bearing construction costs allocated to irrigation and assigned for repayment from power revenues. The actual selling price of power would be established at rates consistent with sound business principles and would take into account the irrigation costs to be repaid from power revenues.

A payout schedule was included in the supplemental report of the Secretary illustrating how repayment could be accomplished within a 50-year period, assuming power revenues were applied first to the repayment of power costs. The Department now proposes that in those instances where repayment of bearing costs, such as power and non-interest-bearing costs, such as irrigation, are due concurrently, they will be repaid concurrently to the extent practicable.

A benefit-cost analysis has been made of each initial storage unit and each initial participating project to determine whether or not they are justified to the Nation as Federal developments. This analysis compares Federal project costs with tangible project benefits. It is used by the Bureau of Reclamation in addition to and apart from the repayment analysis.

The benefit-cost analysis covers the widespread local, regional and national benefits which are not included in the repayment analysis.

Such benefits susceptible to monetary evaluation are known as tangible benefits, and are used in the benefit-cost comparison. Other benefits for which no monetary value can be estimated are known as intangible and do not appear in this analysis.

There are three main types of tangible irrigation benefits used in the benefit-cost ratio—direct, indirect, and public.

Direct benefits are the increase in net farm income; indirect benefits, the increase in profits of businesses handling, processing, and marketing farm products, and the increase in the supply of goods and services. Public irrigation benefits comprise the increase or improvement in settlement investment opportunities and in community facilities and services.

In general, benefits from power and municipal and industrial water are limited to the costs of providing such power and water from the most economical alternative sources.

Flood control, recreational, and fish and wildlife benefits are computed by the Corps of Engineers, the National Park Service, and the Fish and Wildlife Service, respectively.

The cost side of the benefit-cost comparison includes all Federal or project costs. These are construction costs, interest costs, and operation, maintenance and replacement costs.

The recommended units of the storage project and the participating projects collectively and individually would have tangible benefits greater than costs.

In a plan of this magnitude the authorities and laws under which the various features would be constructed, administered, and operated would normally present serious problems, and certainly would raise grave questions of jurisdiction.

The plan before you is happily free of such complications. The storage project, with its regulatory reservoirs, is of interstate significance, and each of its units would be so treated. These would be constructed, operated, and maintained by the Bureau of Reclamation, and, as far as water is concerned, would be operated in conformance with the Mexican Water Treaty, the Colorado River and upper Colorado River basin compacts. The last document includes provisions to cover all the necessary aspects of such operation.

The participating projects are consumptive-use projects intrastate in character. In the proposed plan these projects would be constructed, operated, and maintained under reclamation law. Water rights would therefore be obtained and administered under the water code of the State in which the project would be built. The participating projects would in general be operated and maintained by water users' organizations after construction.

The plan includes the formation of appropriate districts, preferably of the water conservancy type and subject to Secretary approval, as contracting entities to represent project water users in project operation, repayment, and other matters.

In addition to the two units of the storage project and 11 participating projects I have discussed, the bill before you includes the Cross Mountain, Curecanti, Flaming Gorge and Navaho units of the storage project and the Gooseberry, San Juan-Chama and Navaho participating projects.

The bill provides that the Curecanti Dam shall be constructed to a height which will impound not less than 940,000 acre-feet of water or will create a reservoir of such greater capacity as can be obtained by a high water line located at 7,520 feet above mean sea level. The additional units of the storage project were covered in the 1950 report on the Colorado River storage project and participating projects and in the 1953 supplemental report of the Secretary.

Analyses of the Curecanti unit for any size reservoir, when a dam and powerplant at the Curecanti site are considered alone, indicate that power from the site would be more expensive than power from alternative sources. Preliminary studies are now in progress of a modified plan of development for this unit, including additional downstream power drops dependent on storage regulation at the Curecanti Reservoir. A summary statement of reconnaissance data on this modified plan is attached.

As I have previously stated, the Navaho Reservoir is treated as a feature of the potential Navaho participating project mentioned below rather than as a unit of the storage project.

Project reports have been prepared on the Gooseberry, San Juan-Chama and Navaho projects. Reports on the Gooseberry, San Juan-Chama and Navaho projects recently prepared by regions 4 and 5 of the Bureau of Reclamation and Bureau of Indian Affairs, respectively, are yet to be circulated to other agencies, States, and local interests for review in accordance with the 1944 Flood Control Act.

The present plan of development, as covered in the report on the San Juan-Chama participating project, is a modification of the plan presented for this project at the congressional hearings in 1954.

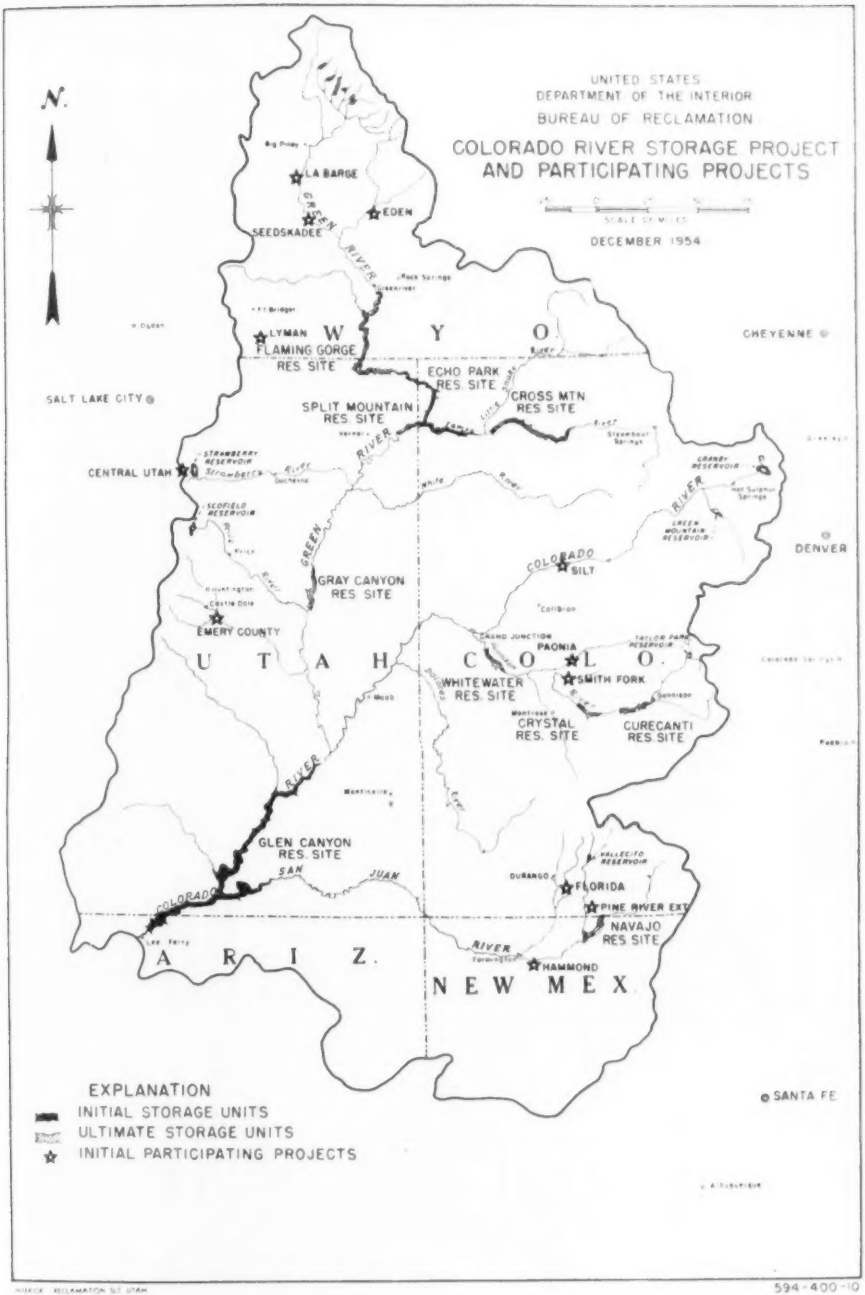
Brief summary statements on the Gooseberry, the modified San Juan-Chama and the Navaho participating projects are attached. A summary (table II), including the units and participating projects covered in the Secretary's supplemental report as well as the additional units and participating projects in the bill, is also attached.

The additional 3 units of the storage project in the bill would have a total storage capacity of about 10,080,000 acre-feet and an installed hydroelectric generating capacity of 172,000 kilowatts.

The 3 additional participating projects would bring into agricultural production 137,250 acres of new land and provide supplemental water of 245,400 acres of land now irrigated but with an inadequate water supply, as well as develop 55,800 acre-feet annually for municipal and industrial uses.

They would further deplete the flows of the upper basin by about 589,000 acre-feet annually.

(The information referred to follows:)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UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
COLORADO RIVER STORAGE PROJECT
AND PARTICIPATING PROJECTS
SCALE OF MILES
DECEMBER 1954
LA BARGE
EDEN
SEEDSKADEE
GREEN RIVER
LYMAN
FLAMING GORGE RES. SITE
W Y O
CHEYENNE
ECHO PARK RES. SITE
SALT LAKE CITY
SPLIT MOUNTAIN RES. SITE
CROSS MTN RES. SITE
YAMPA RIVER
CENTRAL UTAH
STRAWBERRY RESERVOIR
WHITE RIVER
GRAND RESERVOIR
SCOFIELD RESERVOIR
GREEN MOUNTAIN RESERVOIR
COLORADO RIVER
DENVER
SILT
GRAY CANYON RES. SITE
EMERY COUNTY
GRAND JUNCTION
PAONIA
TAYLOR PARK RESERVOIR
U T A H
C O L O.
WHITEWATER RES. SITE
SMITH FORK
CRYSTAL RES. SITE
CURECANTI RES. SITE
GLEN CANYON RES. SITE
SAN JUAN RIVER
COLORADO RIVER
DURANGO
VALLECITO RESERVOIR
FLORIDA
PINE RIVER EXT.
NAVAJO RES. SITE
RIVER
HAMMOND
A R I Z.
N E W M E X
SANTA FE
EXPLANATION
INITIAL STORAGE UNITS
ULTIMATE STORAGE UNITS
INITIAL PARTICIPATING PROJECTS

594-400-10

TABLE 1.—*Summary of initial units of Colorado River storage project and 12 participating projects*

Project and State	Lands to be irrigated		Generating capacity	Municipal water annually	Stream depletion annually	Construction costs					Repayment of reimbursable costs [2]		
								Reimbursable allocations					
	New	Supplemental				Total [1]	Nonreimbursable	Power	Municipal water	Irrigation	By water users [3]	By initial power units (Echo Park, Glen Canyon, central Utah)	Total
Colorado River storage project:													
Initial units:													
Echo Park unit, Colorado and Utah	*Acres*	*Acres*	*Kilowatts*	*Acre-feet*	*Acre-feet*								
			200,000		87,000	$176,426,000		$128,383,000		$48,013,000		$176,426,000	$176,426,000
Glen Canyon unit, Arizona and Utah			800,000		526,000	421,270,000		370,974,000		50,296,000		421,270,000	421,270,000
Subtotal initial units			1,000,000		613,000	597,626,000		499,357,000		98,339,000		597,696,000	597,696,000
Recreation development of Dinosaur National Monument, Colorado and Utah						21,000,000	$21,000,000						
11 participating projects:													
LaBarge, Wyoming	7,970				14,200	1,673,300				1,673,300	$495,000	1,178,300	1,673,300
Seedskadee, Wyoming	60,720				110,400	23,272,000				23,272,000	4,785,000	18,487,000	23,272,000
Lyman, Wyoming		40,600			0	10,564,000				10,564,000	2,255,000	8,309,000	10,564,000
Silt, Colorado	1,900	5,400			5,800	3,356,000	73,600			3,282,400	1,020,000	2,262,400	3,282,400
Smith Fork, Colorado	2,270	8,160			7,500	3,367,000	21,000			3,343,000	1,015,000	2,298,000	3,343,000
Paonia, Colorado	2,210	14,830			9,000	6,944,000	152,400			6,791,600	2,414,000	4,377,600	6,791,600
Florida, Colorado	6,300	12,650			12,900	6,941,500	437,900			6,503,600	1,711,500	4,792,100	6,503,600
Pine River project extension, Colorado and New Mexico	15,150				28,300	5,027,000				5,027,000	2,045,000	2,982,000	5,027,000
Emery County, Utah	3,630	20,450			15,500	9,865,500	229,000			9,636,500	3,715,000	5,921,500	9,636,500
Central Utah (initial phase), Utah	28,540	131,840	61,000	48,800	189,400	231,044,000	5,991,000	46,699,000	$45,500,000	127,354,000	[4] 60,691,000	[5] 158,862,000	[5] 219,553,000
Hammond, New Mexico	3,670				7,900	2,302,000				2,302,000	370,000	1,932,000	2,302,000
Subtotal, 11 initial projects	132,360	233,930	61,000	48,800	400,900	304,356,300	6,907,900	46,699,000	45,500,000	199,749,400	80,516,500	211,401,900	291,948,400

Additional participating project authorized and under construction: Eden, Wyoming	10,660	9,540			32,400	7,287,000				7,287,000	1,500,000	5,787,000	7,287,000
Total, 12 participating projects	143,020	243,470	61,000	48,800	433,300	311,643,300	6,907,900	46,699,000	48,500,000	207,036,400	82,046,500	217,188,900	299,235,400
Grand total	143,020	243,470	1,061,000	48,800	1,946,300	[7] 930,339,300	27,907,900	546,056,000	45,500,000	305,375,400	82,046,500	814,884,900	896,931,400

[1] Exclusive of nonreimbursable CRDF expenditures.
[2] Costs allocated to power and municipal water are repaid with interest, including interest during construction.
[3] Repayment by water users toward construction costs over 50-year repayment period beyond a reasonable irrigation development period except 60-year period for Eden project and 68-year period for Paonia project.
[4] Includes $15,191,000 in irrigation revenues and $45,500,000 from municipal and industrial water users.
[5] Includes $27,838,000 of excess power revenues from the central Utah project powerplants accruing during the irrigation repayment periods of this project.
[6] Exclusive of $5,500,000 allocable to purposes of the ultimate phase of central Utah project.
[7] Includes cost ($7,287,000) of authorized Eden project now nearing completion and $2,035,000 expended on Paonia project under previous authorization.

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TABLE 2.—*Summary with additional units of Colorado River storage project and additional participating projects added to table 1*

Project and State	Lands to be irrigated		Generating capacity	Municipal water annually	Stream depletion annually	Construction costs					Repayment of reimbursable costs [1]		
								Reimbursable allocations					
	New	Supplemental				Total [2]	Nonreimbursable	Power	Municipal water	Irrigation	By water users [3]	By power	Total
	Acres	*Acres*	*Kilowatts*	*Acre-feet*	*Acre-feet*								
Colorado River storage project: Subtotal initial units (table 1)			1,000,000		613,000	$597,696,000		$499,357,000		$98,339,000		$597,696,000	$597,696,000
Additional units:													
Cross Mountain, Colorado			60,000		70,000	50,225,000		36,329,000		13,896,000		[4] 50,225,000	
Curecanti, Colorado			40,000		18,000	49,305,000		41,205,000		8,100,000		[4] 49,305,000	
Flaming Gorge, Utah and Wyoming			72,000		56,000	82,942,000		52,042,000		30,900,000		[4] 82,942,000	
Subtotal			172,000		144,000	182,472,000		129,576,000		52,896,000		182,472,000	
Total storage units			1,172,000		757,000	780,168,000		628,933,000		151,235,000		780,168,000	
Recreational development of Dinosaur National Monument, Colorado and Utah (table 1)						21,000,000	$21,000,000						
Participating projects: Subtotal 12 initial projects (table 1)	143,000	243,470	61,000	48,800	433,300	311,643,300	6,907,900	46,699,000	$45,500,000	207,036,400	$82,046,500	217,188,900	299,235,400
Additional projects:													
Gooseberry, Utah		16,400			12,500	5,760,500	33,000			5,727,500	2,375,000	[5] 3,352,500	
Navaho, New Mexico	137,250				341,400	[5] 211,237,300	1,298,000			209,939,000	30,730,000	[6] 179,209,300	
San Juan-Chama, New Mexico		225,000		55,800	235,000	[5] 135,169,000	470,000		26,775,000	107,924,000	54,665,000	[6] 80,034,000	
Subtotal	137,250	241,400		55,800	588,900	352,163,800	1,801,000		26,775,000	323,590,800	87,770,000	262,595,800	
Total participating projects	280,250	484,870	61,000	104,600	1,022,200	663,810,100	8,708,900	46,669,000	72,275,000	530,627,200	169,816,500	[7] 479,784,700	
Grand total	280,250	484,870	1,233,000	104,600	1,779,200	1,464,978,100	29,708,900	675,632,000	72,275,000	681,862,200	169,816,500	1,259,952,700	

[1] Costs allocated to power and municipal water are repaid with interest, including interest during construction.

[2] Exclusive of nonreimbursable Colorado River development fund expenditures.

[3] Repayment by irrigation water users toward construction costs over a 50-year repayment period following a reasonable development period.

[4] A power rate of more than 6 mills would be required for these units to repay their construction cost in 50 years at 2.5 percent interest.

[5] $800,000 of the $36,400,000 estimated cost for Navaho Dam and Reservoir allocated to the San Juan-Chama project for added capacity necessary to serve the San Juan-Chama project.

[6] Would require an extension of the payout period used in table 1 or an increase in the average power rate.

[7] Exclusive of $5,500,000 allocable to purposes of the ultimate phase of central Utah project.

Statement on La Barge Project, Wyoming

The potential La Barge project would make a direct flow diversion from Green River, a principal tributary of the Colorado River, to provide for the irrigation of 7,970 acres of desert lands in Sublette and Lincoln Counties in southwestern Wyoming. Only about 300 acres of these lands receive any irrigation water at the present time. Their meager supply would likely be used on other lands outside the project area if the project was constructed. Water for domestic and stock-watering use on farms in the project area would be taken from project canals and from shallow wells that would be developed by the water users.

Project lands would generally be utilized for the support of livestock enterprises. Climatically adaptable crops, such as hay, small grain, pasture, and some garden crops would be produced. The principal livestock would be dairy cows and sheep. Analyses made indicate that an average farm of about 210 irrigated acres in the project area would provide the farm family with a reasonable standard of living, provide employment for the available family labor, and permit payment of operation, maintenance, and replacement costs and some payment toward construction costs of project facilities.

Detailed land classification surveys show the project lands to be suitable for sustained production of crops under irrigation farming. Water supply studies, based on records of streamflows as they have occurred in the past, indicate that an adequate irrigation supply of 24,300 acre-feet annually would be available for the project from direct flows with permissible shortages in occasional drought years. A water right for the project can be obtained under Wyoming State law.

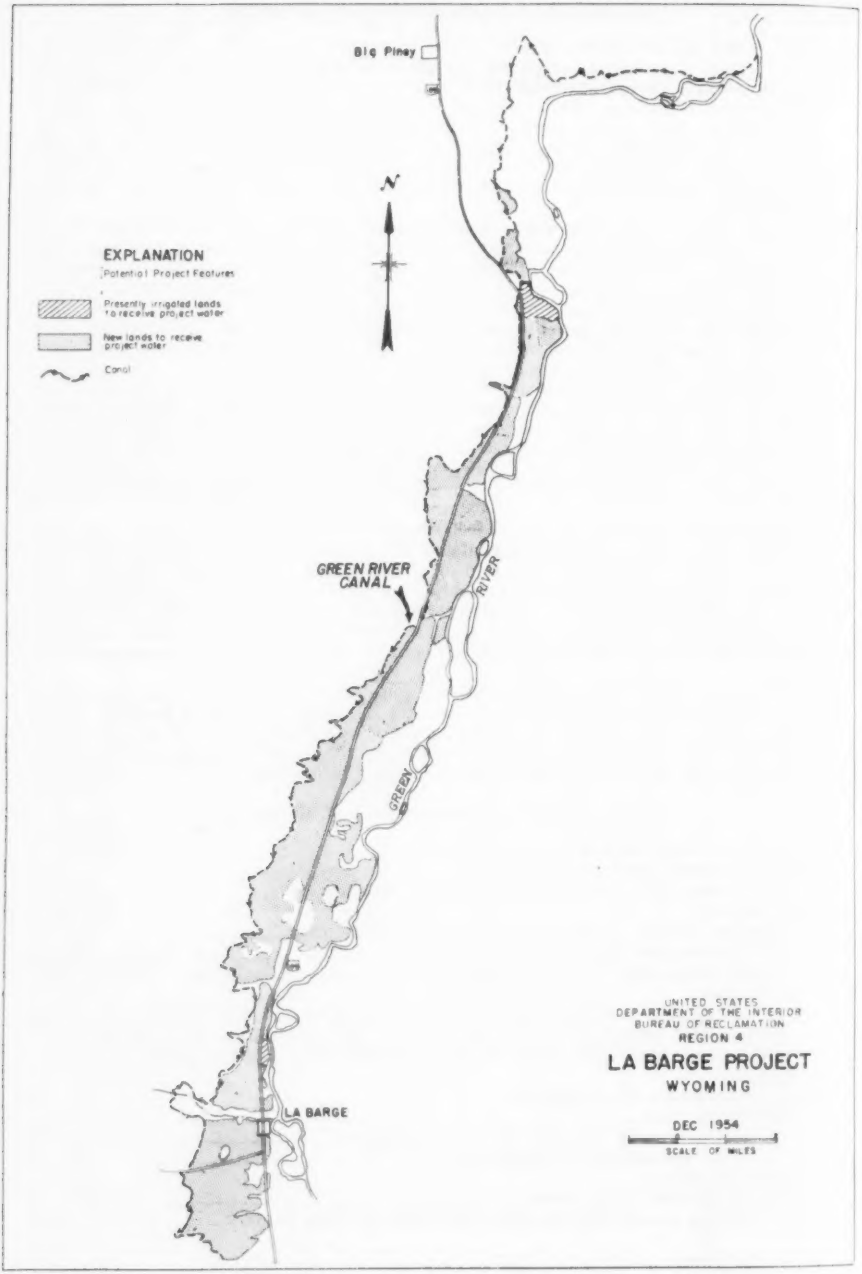
Construction features of the project would include a main diversion and distribution canal with an initial capacity of 175 second-feet and extending approximately 40 miles along the west side of Green River, a few short laterals, and a few short drains as required. Construction of the main canal and the laterals would require about 2 years. Drains would not be completed until a few years after application of water to the land so that the extent of works required could be determined. A period of 2 to 3 years would be required to construct the project.

This statement is based on the physical plan of project development presented in the Bureau of Reclamation report on the La Barge project, Wyoming, dated January 1951, a supplement to the Colorado River Storage project report dated December 1950. Results of current January 1953 estimates for this project plan are summarized in the attached project summary tabulation.

Summary data, La Barge project, Wyoming

Irrigated acreage: New lands, 7,970 acres.
Principal agricultural production:
Hay, pasture and small grain, dairy cows and sheep.

Water supply:	*Acre-feet*
Average annual increase in direct flow diversions	24,300
Average annual increase in storage yield	None
Stream depletion (average annual)	14,200
Project works:	
Construction features would include main diversion and distribution canal with initial capacity of 175 second-feet and extending approximately 40 miles along west side of Green River, a few short laterals and a few short drains.	
Construction cost and repayment:	
Estimated cost	$1,673,300
Reimbursable cost allocated to irrigation	1,673,300
Nonreimbursable allocation	None
Repayment by:	
Irrigation water users	495,000
Power revenues from Colorado River storage project	1,178,300
Total	1,673,300
Annual operation, maintenance, and replacement costs	14,700
Benefit-cost ratio	2.12 to 1



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STATEMENT ON SEEDSKADEE PROJECT, WYOMING

The potential Seedskadee project would divert water from Green River, a principal tributary of the Colorado River, to provide for the irrigation of 60,720 acres of arable dry lands lying along both sides of the river in Lincoln and Sweetwater Counties in southwestern Wyoming. Of the total area 51,960 acres would be included in family-sized farm units and 9,030 acres would be used for community pasture. Water for domestic and stock watering use in the project area would be obtained from project canals and from shallow wells that would be developed by the water users. Fish and wildlife values in the area would probably suffer minor damage as a result of project development. Recreation values would not be materially affected.

With project development, the irrigated lands would be utilized primarily for the support of livestock enterprises, particularly dairy cows and sheep. Climatically adaptable crops, such as grasses for hay and pasture, small grain, alfalfa, and some garden crops would be produced. Analyses made indicate that an average farm of about 200 irrigated acres in the Seedskadee area would be required to provide the farm family with a reasonable standard of living, provide employment for the available family labor, and permit payment of operation, maintenance, and replacement costs of project facilities and some payment toward construction costs of project facilities.

Detailed land classification surveys show the project lands to be suitable for sustained production of crops under irrigation farming. Water supply studies based on records of stream flows as they have occurred in the past indicate that an adequate irrigation supply of 225,800 acre-feet annually would be available from direct flows for the project with permissible shortages in occasional drought years. A water right for the project can be obtained under Wyoming State law.

Principal construction features of the project would include a diversion dam on Green River, a system of main canals and laterals to convey water from the diversion dam and distribute it to project lands, two hydraulic driven pumps at drops in the distribution canals to lift water to some of the lands, and a few miles of artificial drains.

The Seedskadee diversion dam would consist of a low ogee overflow section 400 feet long, canal headworks, a sluiceway, and a dike 1,000 feet long. The Seedskadee diversion canal would extend along the west side of Green River and would convey water from the river to the project lands. It would be 19 miles in length and would have an initial capacity of 1,350 second-feet. The diversion canal would terminate at a bifurcation structure at the headings of the two main canal distribution systems, one serving lands west of the river and the other serving lands east of the river. Main canals in the distribution system would total about 160 miles in length. A lateral system would be constructed to deliver water from the main canals to individual farm tracts.

A construction period of about 8 years, including the completion of definite plan investigations, would be required to complete all project facilities except the drains. Drains would not be completed until several years after application of water to the lands so that the actual extent of drainage works required could be determined.

This statement is based on the physical plan of project development presented in the Bureau of Reclamation report on the Seedskadee project, Wyoming, dated November 1950, a supplement to the Colorado River storage project dated December 1950. Results of current (January 1953) Bureau of Reclamation estimates for this project plan are summarized in the attached project summary tabulation. Studies of the upper Green River Basin made subsequent to 1950 indicate that significant modifications in the project plan may be found desirable during the definite planning stage of the inventigation.

Summary data, Seedskadee project, Wyoming[1]

Irrigated acreage:	*Acres*
New lands (largely public domain)	60,720
Supplemental	None
Total	60,720

[1] Studies in the upper Green River Basin subsequent to 1950 indicate that enlargement of the project area and addition of some storage may be found desirable during the definite plan investigations of the potential project.

Principal agricultural production: Hay, pasture, and small grain; dairy cows and sheep.

Water supply:	*Acre-feet*
Increase in average annual direct flow diversions	225,800
Increase in average annual storage yield	None
Stream depletion (average annual)	110,400

Project works:

Construction features would include a diversion dam on the Green River, a system of main canals and laterals, 2 hydraulic driven pumps and a few miles of drains. The diversion canal, 19 miles in length, would have an initial capacity of 1,350 second-feet. Main canals and laterals in the distribution system would total about 160 miles in length.

Cost and repayment:	
Estimated cost	$23,272,000
Reimbursable cost allocated to irrigation	23,272,000
Nonreimbursable allocation	None
Repayment by:	
Irrigation water users	4,785,000
Power revenues from Colorado River storage projects	18,487,000
Total	23,272,000
Annual operation maintenance, and replacement costs	136,600
Benefit-cost-ratio	1.46 to 1

STATEMENT ON LYMAN PROJECT, WYOMING

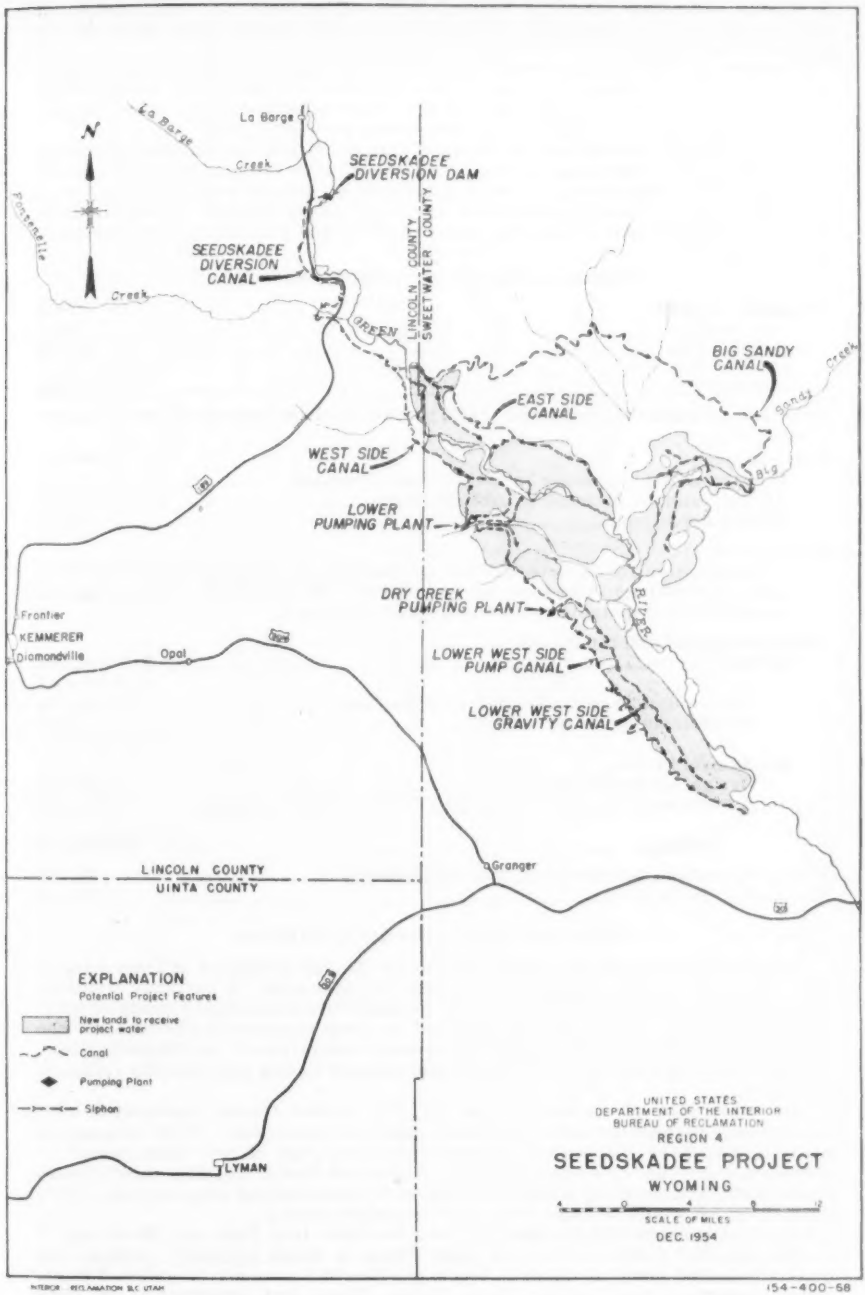
The potential Lyman project is contemplated as a means of improving the late-season irrigation water supply and thus of bettering agricultural production on 40,600 acres of land near the town of Lyman in Bridge Valley, a part of the upper Colorado River Basin in southwestern Wyoming. The lands are now irrigated with only a partial supply.

Because of the semiarid climate in the area, irrigation is necessary for successful crop production. Only grasses for hay and pasture, alfalfa, and some small grains can be produced to any extent as the growth of most other crops is precluded by a short growing season and untimely summer frosts that characterize the high 6,500- to 7,000-foot elevations of the project lands. Additional late-season irrigation water is needed to increase yields of the forage and grain crops to bolster the all-important local livestock industry. Principal livestock would be dairy cows and beef cattle.

The Lyman project would provide late-season irrigation water through construction of a dam and reservoir with 43,000 acre-feet total capacity at the Bridger site on Willow Creek to store the spring flood flows of Blacks Fork and its tributary, West Fork of Smiths Fork. Surplus flows of these streams, now largely used for excessive irrigation in the spring runoff season, would be conveyed to the reservoir by 2 feeder canals, 1 diverting from each of the streams. The water would be retained in the reservoir until needed and then released to the Willow Creek Channel. Enlargement of a few miles of this channel and construction of three canals to divert from this enlarged channel would provide the necessary facilities along with the existing irrigation systems in the area to effect the distribution of the water to project lands. The existing canal systems would be improved and extended as necessary. Drains would be provided where necessary to improve the removal of unavoidable waste and excess surface waters on the irrigated lands and to protect the lands from accumulations of harmful salts.

Preliminary land classification surveys indicate that project lands would be suitable for sustained irrigation farming although detailed surveys will be necessary to firmly establish their suitability. Some presently irrigated lands that may be found to be nonarable could be abandoned and their water supply transferred to readily accessible arable lands now idle.

Water supply studies, based on records and estimates of streamflows as they have occurred in the past, indicate the project would increase the irrigation supply from storage by an average of 32,500 acre-feet annually and reduce the present average irrigation shortage of 37 percent to an average of 12 percent. A water right for the project can be obtained for the project as planned under


N
La Barge
La Barge Creek
Fontenelle Creek
SEEDSKADEE DIVERSION DAM
SEEDSKADEE DIVERSION CANAL
GREEN
LINCOLN COUNTY
SWEETWATER COUNTY
BIG SANDY CANAL
Big Sandy Creek
EAST SIDE CANAL
WEST SIDE CANAL
LOWER PUMPING PLANT
DRY CREEK PUMPING PLANT
Green River
LOWER WEST SIDE PUMP CANAL
LOWER WEST SIDE GRAVITY CANAL
Frontier
KEMMERER
Diamondville
Opal
Granger
LINCOLN COUNTY
UINTA COUNTY
LYMAN
EXPLANATION
Potential Project Features
New lands to receive project water
Canal
Pumping Plant
Siphon
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
REGION 4
SEEDSKADEE PROJECT
WYOMING
SCALE OF MILES
DEC. 1954
INTERIOR - RECLAMATION SLC UTAH
154-400-58

Wyoming State law provided the necessary agreements and adjustments in water rights can be negotiated with holders of prior natural flow rights in the project area.

A period of 5 or 6 years would be required to complete definite plan investigations and construction of the project facilities excepting the drains. The drains would not be completed until a few years after operation of the project and the actual extent of drainage required could be determined.

This statement is based on the physical plan of project development presented in the Bureau of Reclamation report on the Lyman project, Wyoming, dated October 1950, a supplement to the Colorado River storage project report dated December 1950. Results of current (January 1953) Bureau of Reclamation estimates for this project plan are summarized in the attached project summary tabulation.

Summary data, Lyman project, Wyoming

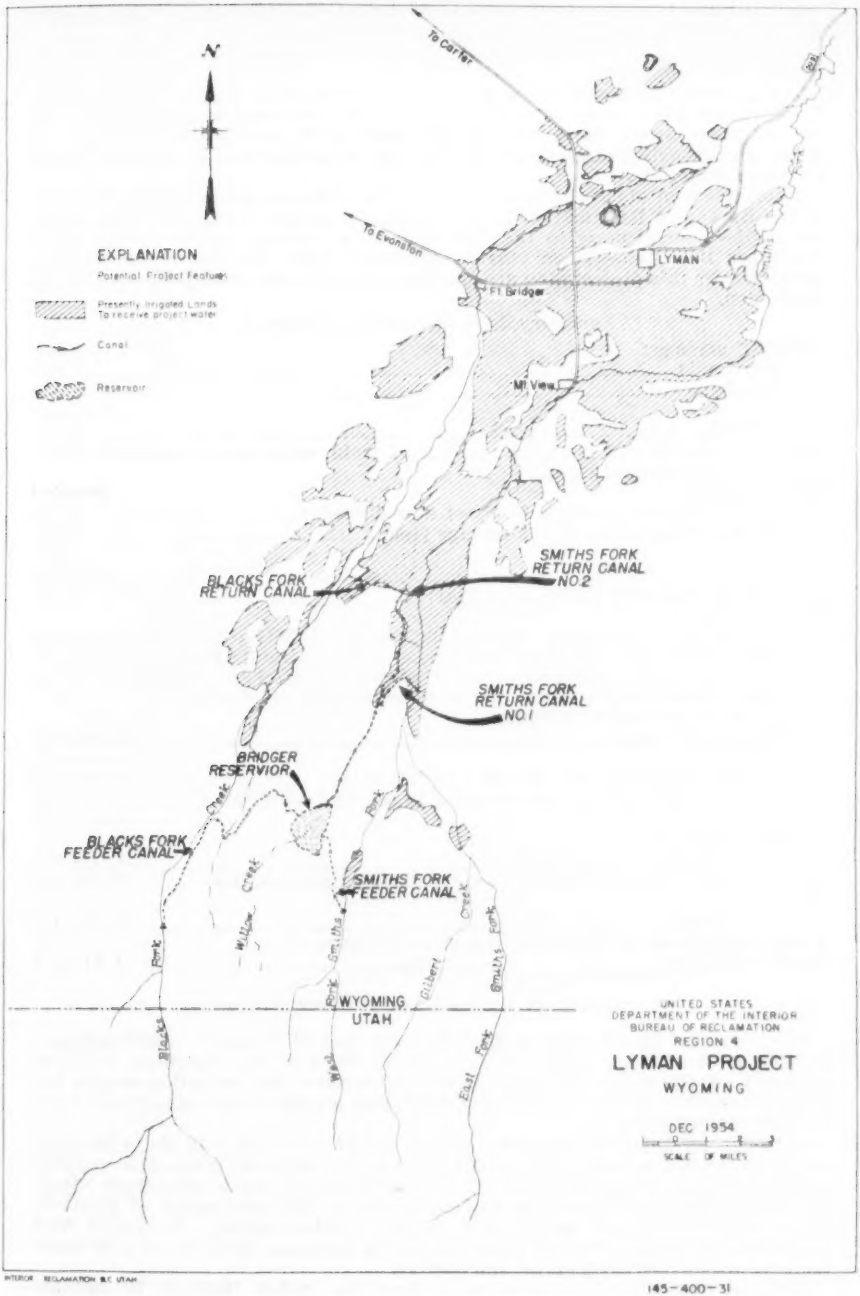
Irrigated acreage:	*Acres*
New lands	None
Supplemental	40,600
Total	40,600
Principal agricultural production: Hay, pasture, and small grain; dairy cows and beef cattle.	
Water supply:	*Acre-feet*
Average annual increase in direct flow diversion	0
Average annual increase in storage yield	32,500
Stream depletion	None
Project works: Construction features would include the Bridger Dam and Reservoir with total of 43,000 acre-feet capacity ,enlargement of the Willow Creek Channel, construction of 3 canals and some drainage facilities.	
Construction cost and repayment:	
Estimated cost	$10,564,000
Reimbursable cost allocated to irrigation	10,564,000
Nonreimbursable allocation	None
Repayment by:	
Irrigation water users	2,255,000
Power revenues from Colorado River storage project	8,309,000
Total	10,564,000
Annual operation, maintenance, and replacement	45,900
Benefit-cost ratio	1.01 to 1

STATEMENT ON SILT PROJECT, COLORADO

The potential Silt project would provide for the full irrigation of 1,900 acres of new land and provide supplemental water to 5,400 acres of partially irrigated land, all in the vicinity of Rifle and Silt, communities in Garfield County of west-central Colorado. The lands are situated in three compact blocks north of the Colorado River between Rifle and Elk Creeks, tributaries of the Colorado River. The project would also provide some enhancement in fish and wildlife values in the area.

The basic type of agriculture in the area would remain unchanged with project development because of climatic and soil conditions. With late-season water provided by the project, however, the plantings of row crops would be increased somewhat as would the yield of livestock feeds. Alfalfa, small grains, sugar beets, and potatoes would continue to be the principal crops grown. Principal livestock would be dairy cows, beef cattle and sheep.

Principal construction features include the Rifle Gap Dam and Reservoir of 10,000 acre-feet total capacity on Rifle Creek, a small hydraulic turbine and direct-connected pump at the dam, reconstruction of 1 presently abandoned ditch, rehabilitation of the existing Grass Valley Canal and construction of some laterals and drains. Except for minor drainage work, about 3 years would be required for construction of project features, including the completion of definite plan investigations.



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Preliminary land classification surveys indicate that the lands would be suitable for sustained crop production under irrigation farming. A detailed classification of the presently unirrigated lands would be required to confirm the degree of their suitability.

Water supply studies based on records of streamflows as they have occurred in the past indicate that an adequate irrigation supply would be available for the project from direct flows and storage yield with permissible shortages in occasional drought years. A water right for the project can be obtained under Colorado State law.

This statement is based on the physical plan of project development presented in the Bureau of Reclamation report on the Silt project, Colorado, dated January 1951—a supplement to the Colorado River storage project report dated December 1950. Results of current (January 1953) Bureau of Reclamation estimates for this project plan are summarized in the attached project summary tabulation.

Summary data, Silt project, Colorado

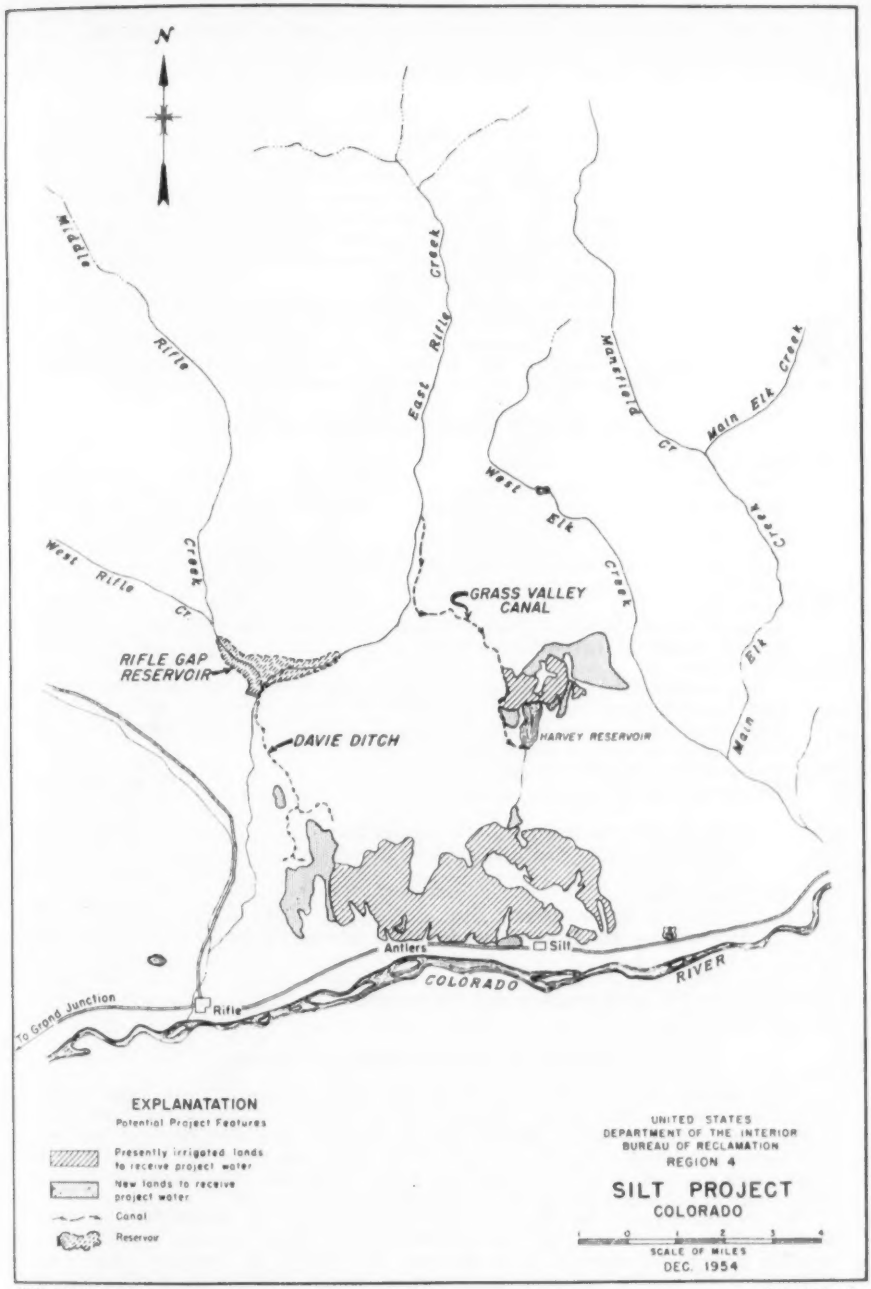
Irrigated acreage:	*Acres*
New lands	1,900
Supplemental	5,400
Total	7,300
Principal agricultural production: Alfalfa, grain, sugar beets, potatoes; dairy cows, beef cattle and sheep.	
Water supply:	*Acre-feet*
Average annual increase in direct flow diversion	4,200
Average annual increase in storage yield	5,900
Total	10,100
Stream depletion (average annual)	5,800
Project works:	
Principal construction features include the Rifle Gap Dam and Reservoir with 10,000 acre-feet total capacity, a small hydraulic turbine and direct-connected pump, reconstruction of abandoned ditch, rehabilitation of an existing canal and construction of some laterals and drains.	
Construction cost and repayment:	
Estimated cost	$3,356,000
Reimbursable cost allocated to irrigation	3,282,400
Nonreimbursable cost allocated to fish and wildlife	73,600
Repayment by:	
Irrigation water users	1,020,000
Power revenues from Colorado River storage project	2,262,400
Total	3,282,400
Annual operation, maintenance, and replacement costs	8,400
Benefit-cost ratio	1.71 to 1

STATEMENT ON SMITH FORK PROJECT, COLORADO

The potential Smith Fork project in west central Colorado would regulate surplus flows of Iron Creek and the Smith Fork of the Gunnison River, a tributary of the upper Colorado River, to increase the irrigation supply for 8,160 acres of land now partially irrigated and provide a new supply for 2,270 acres now unirrigated.

Although an improved irrigation supply would permit new lands to be cultivated and result in better crop yields on presently irrigated lands, the cropping program is largely controlled by climatic soil and topographic conditions. Most of the acreage would continue to be utilized for the production of livestock feeds with hay, small grains, and pasture predominating. Increased feed production in the area would result mostly in increased dairy cows with some increase also in beef cattle, hogs, and poultry.

Detailed land classification surveys show the project lands to be suitable for sustained production of crops under irrigation farming.


N
Middle Rifle Creek
East Rifle Creek
Mansfield Cr
Main Elk Creek
West Elk Creek
West Rifle Cr
GRASS VALLEY CANAL
RIFLE GAP RESERVOIR
DAVIE DITCH
HARVEY RESERVOIR
Main Elk Creek
Antlers
Silt
COLORADO RIVER
To Grand Junction
Rifle
EXPLANATATION
Potential Project Features
Presently irrigated lands to receive project water
New lands to receive project water
Canal
Reservoir
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
REGION 4
SILT PROJECT
COLORADO
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SCALE OF MILES
DEC. 1954

514-400-13

Water supply studies, based on records of streamflows as they have occurred in the past, indicate that an adequate irrigation supply would be available for the project from direct flows and storage water with permissible shortages in occasional drought years. A water right for the project can be obtained under Colorado State law.

Construction features of the project include a storage dam and reservoir with 14,000 acre-feet total capacity at the Crawford site on Iron Creek, the Smith Fork diversion dam, the 2.7-mile long Smith Fork feeder canal of 100 second-feet, to divert from Smith Fork to Crawford Reservoir, the 6.6-mile Aspen canal of 145 second-feet initial capacity to convey water from Crawford Reservoir to part of the project lands and feed existing ditches and 4 small lateral canals. Existing irrigation facilities in the area would be utilized as fully as practicable. A period of 3 to 4 years would be required to complete definite plan investigations and construct the project works.

This statement is based on the physical plan of project development presented in the Bureau of Reclamation report on the Smith Fork project, Colorado, a supplement to the Colorado River storage project report dated December 1950. Results of current (January 1953) Bureau of Reclamation estimates for this project plan are summarized in the attached project summary tabulation.

Summary data, Smith Fork project, Colorado

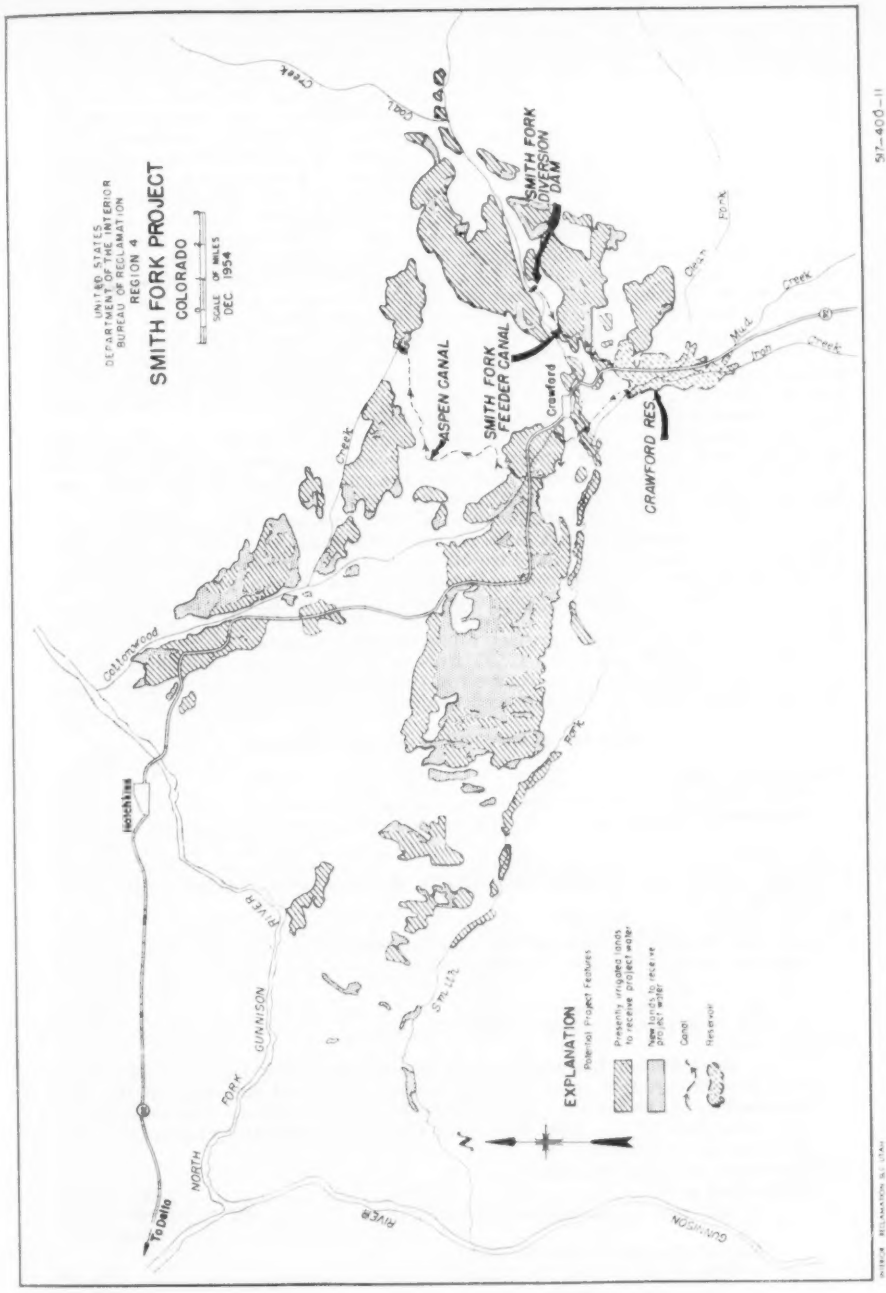
Irrigation acreage:	*Acres*
New lands	2,270
Supplemental	8,160
Total	10,430
Principal agricultural production: Alfalfa, pasture and grain; dairy cows and beef.	
Water supply:	*Acre-feet*
Average annual increase from direct flow diversions and storage	13,650
Stream depletion (average annual)	7,500
Project works:	
The construction features include the Crawford Dam and Reservoir, with 14,000 acre-feet of total capacity, Smith Fork diversion dam, the 2.7-mile-long Smith Fork feeder canal of 100 second-feet, 6.6-feet-long Aspen canal of 145 second-feet and 4 small lateral canals.	
Construction cost and repayment:	
Estimated cost	$3,367,000
Reimbursable cost allocated to Irrigation	3,343,000
Nonreimbursable cost allocated to Recreation	24,000
Repayment by:	
Irrigation water users	1,045,000
Power revenues from Colorado River storage project	2,298,000
Total	3,343,000
Annual operation, maintenance and replacement	8,400
Benefit-cost ratio	1.27 to 1

STATEMENT ON PAONIA PROJECT, COLORADO

The potential Paonia project would divert water from the North Fork of the Gunnison River in the upper Colorado River basin to improve the irrigation water supply, and thus the agricultural production, of 17,040 acres of land in west-central Colorado. Of these lands 14,830 acres are presently irrigated and 2,210 acres are arable but not now irrigated. Fish and wildlife values in the area would be enhanced and flood damages would be decreased.

The general type of farming now practiced in the area would be continued with project development but the additional irrigation supplies would make possible a more intensive crop production. Production of livestock foods and fruit, such as apples, peaches, and cherries, would continue to be the major crops grown. Principal livestock would be dairy cows and beef cattle.

Under the project plan, the Spring Creek Dam and Reservoir would be constructed at a site on Muddy Creek 1 mile about its junction with the North Fork River. The reservoir would have a capacity of 18,000 acre-feet, of which


UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
REGION 4
SMITH FORK PROJECT
COLORADO
SCALE OF MILES
DEC 1954
SMITH FORK DIVERSION DAM
SMITH FORK FEEDER CANAL
ASPEN CANAL
CRAWFORD RES
Crawford
Cedaredge
Hotchkiss
Paonia
Delta
NORTH FORK GUNNISON RIVER
GUNNISON RIVER
EXPLANATION
Potential Project Features
Presently irrigated lands to receive project water
New lands to receive project water
Canal
Reservoir
N
SF-400-11

11,000 acre-feet would be active and 7,000 acre-feet would be reserved for sediment retention and dead storage. The existing Fire Mountain Canal diverting from the North Fork River 5 miles below the Spring Creek Dam would be enlarged and extended. The enlarged canal would be capable of diverting an increased amount of natural streamflow during the early irrigation season and in the late season its supply would be supplemented by water released from the reservoir. In this manner the irrigation water supply for lands under the Fire Mountain Canal would be improved and through its extension the canal would also serve lands on Rogers Mesa that heretofore have been irrigated from Leroux Creek, a tributary of the North Fork River. The Leroux Creek water thus released from Rogers Mesa would be diverted into the higher Overland Canal, which would be improved and enlarged for this purpose, and used to augment the present irrigation supply for lands on Redlands Mesa. Beginning at a point on the Fire Mountain Canal 9 miles below its head, the Minnesota siphon would be constructed to convey part of the water southward 12,000 feet across the North Fork River to the existing Minnesota Canal.

Water supply studies based on records of streamflows as they have occurred in the past indicate that with project development the irrigation supply for project lands would be increased by 18,500 acre-feet annually from direct flows and storage yield. The increase in stream depletion attributable to the development is estimated at an average of 9,000 acre-feet annually.

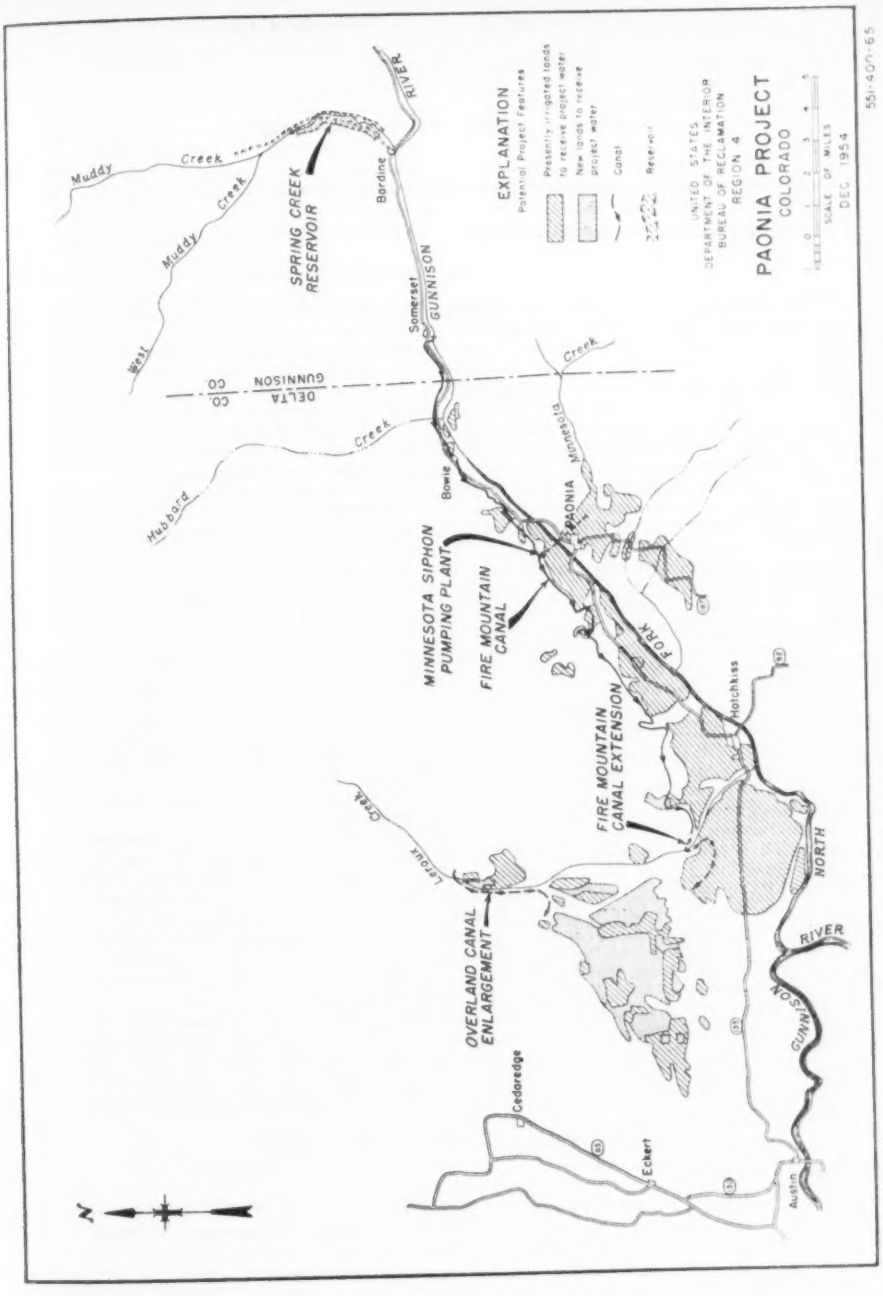
Land classification surveys indicate that the lands would be suitable for sustained crop production under irrigation farming. Some further detailed classification would be required to confirm the suitability of all the lands, particularly in the Leroux Creek and Minnesota areas.

The project, exclusive of the Minnesota unit, was authorized, under a modification of the above-described plan, by act of Congress on June 25, 1947. Enlargement and extension of the Fire Mountain Canal has been essentially completed under this authorization. Reauthorization of the project, under the revised plan described above, was recommended in the Bureau of Reclamation report on the "Paonia project, Colorado" dated February 1951, a supplement to the Colorado River storage project report dated December 1950.

Results of current (January 1953) Bureau of Reclamation estimates for the physical plan of the project as covered in the Paonia project report of February 1951 are summarized in the attached project summary tabulation.

Summary data, Paonia project, Colorado

Irrigated acreage:	*Acres*
New lands	2,210
Supplemental	14,830
Total	17,040
Principal agricultural production: Alfalfa, grain, apples, peaches, dairy cows, and beef cattle.	
Water supply:	*Acre-feet*
Average annual increase in direct flow diversions	7,500
Average annual increase in storage yield	11,000
Total	18,500
Stream depletion (average annual)	9,000
Project works:	
The construction features include the Spring Creek Dam and Reservoir with 18,000 acre-feet total capacity, enlargement and extension of the Fire Mountain and Overland Canals and the Minnesota siphon. The enlargement and extension of the Fire Mountain Canal is essentially completed under prior project authorization.	
Construction cost and repayment:	
Estimated cost	$6,944,000
Reimbursable cost allocated to irrigation	6,791,600
Nonreimbursable cost allocted to:	
Flood control	74,100
Fish and wildlife	70,800
Recreation	7,500
Total	152,400


PAONIA PROJECT
COLORADO
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
REGION 4
DEC 1954
EXPLANATION
Potential Project Features
Presently irrigated lands to receive project water
New lands to receive project water
Canal
Reservoir
SPRING CREEK RESERVOIR
MINNESOTA SIPHON
PUMPING PLANT
FIRE MOUNTAIN CANAL
FIRE MOUNTAIN CANAL EXTENSION
OVERLAND CANAL ENLARGEMENT
NORTH FORK
GUNNISON RIVER
Muddy Creek
West Muddy Creek
Hubbard Creek
Leroux Creek
Minnesota Creek
Bardine
Somerset
Bowie
PAONIA
Hotchkiss
Cedaredge
Eckert
Austin
DELTA CO
GUNNISON CO

Summary data, Paonia project, Colorado—Continued

Construction cost and repayment—Continued	
Repayment by:	
Irrigation water users[1]	2,414,000
Power revenues from Colorado River storage project	4,377,600
Total	6,791,600
Annual operation, maintenance, and replacement costs	11,100
Benefit-cost ratio	1.6 to 1

[1] Based on 68-year repayment period as provided under project authorizing act of 1947.

STATEMENT ON FLORIDA PROJECT, COLORADO

The potential Florida project is planned primarily to supply irrigation water to, and thus increase the agricultural production on, 18,950 acres of Florida Mesa and Florida River Valley lands in the upper Colorado River basin in southwestern Colorado. The lands include 12,650 acres presently irrigated with only a partial supply and 6,300 acres presently not irrigated. Approximately 1,000 acres of the land, including 100 acres partially irrigated and 900 acres now unirrigated, are owned by Indians. In addition to irrigation values, the project would provide some enhancement in fish and wildlife values in the area and affect some decrease in flood damages along Florida River.

With project development, the irrigated lands would be utilized largely for the support of livestock enterprises as now practiced in the area. Climatically adaptable crops, such as small grains, alfalfa, hay, pasture, and some pinto beans, potatoes, apples, vegetables, and berries, would be produced. Analyses made indicate that a family-size farm would provide the farm family with a reasonable standard of living, provide employment for the available labor, and permit payment of operation, maintenance, and replacement costs of project facilities and some payment toward the construction costs of project facilities.

Preliminary land classification surveys indicate that project lands would be suitable for sustained production of crops under irrigation farming. Detailed land classification would be required to confirm the suitability of all the lands.

Water supply studies based on records of streamflows as they have occurred in the past indicate that an adequate irrigation supply would be available for the project with permissible shortages in occasional drought years. The increase in irrigation supply would average 23,200 acre-feet annually including 6,900 acre-feet of direct flows and 16,300 acre-feet of storage water. Water rights for the project could be obtained under Colorado State law.

Construction features of the project would include the Lemon Dam and Reservoir with a total capacity of 23,300 acre-feet to store water on Florida River, construction of a new diversion dam on Florida River at the head of the existing Florida Farmers ditch, enlargement and extension of the existing Florida Farmers ditch diverting from Florida River, and some distribution and drainage facilities. Water would be released from the reservoir as needed and conveyed in the natural river channel to heads of various downstream canals and ditches that would divert the flow for distribution to project lands. A 3- to 4-year period would be required to complete construction of the project.

This statement is based on the physical plan of project development presented in the Bureau of Reclamation report on the Florida project, Colorado, dated January 1951, a supplement to the Colorado River storage project report dated December 1950. Results of current (January 1953) Bureau of Reclamation estimates for this project plan are sumarized in the attached project summary tabulation.

Summary data, Florida project, Colorado

Irrigated acreage:

	Indian	Non-Indian	Total
New	900	5,400	6,300
Supplemental	100	12,550	12,650
Total	1,000	17,950	18,950

Principal agricultural production: Alfalfa, grains, dairy cows, and beef.

Water supply:	*Acre-feet*
Average annual increase in direct flow diversions	6,900
Average annual increase in storage yield	16,300
Total	23,200
Stream depletion (annual average)	12,900

Project works:

Construction features include Lemon Dam and Reservoir with a total capacity of 23,300 acre-feet, a diversion dam on Florida River, enlargement and extension of existing Florida Farmers ditch, and some distribution laterals and drains.

Construction costs and repayment:	
Estimated cost	$6,941,500
Reimbursable allocation to irrigation	6,503,600
Nonreimbursable allocation to:	
Fish and wildlife	208,700
Flood control	229,200
Total	437,900
Repayment by:	
Irrigation:	
Non-Indian lands	1,585,500
Indian lands	126,000
Total	1,711,500
Power revenues from Colorado River storage project	4,792,100
Total	6,503,600
Annual operation, maintenance, and replacement costs	12,600
Benefit-cost ratio	1.4 to 1

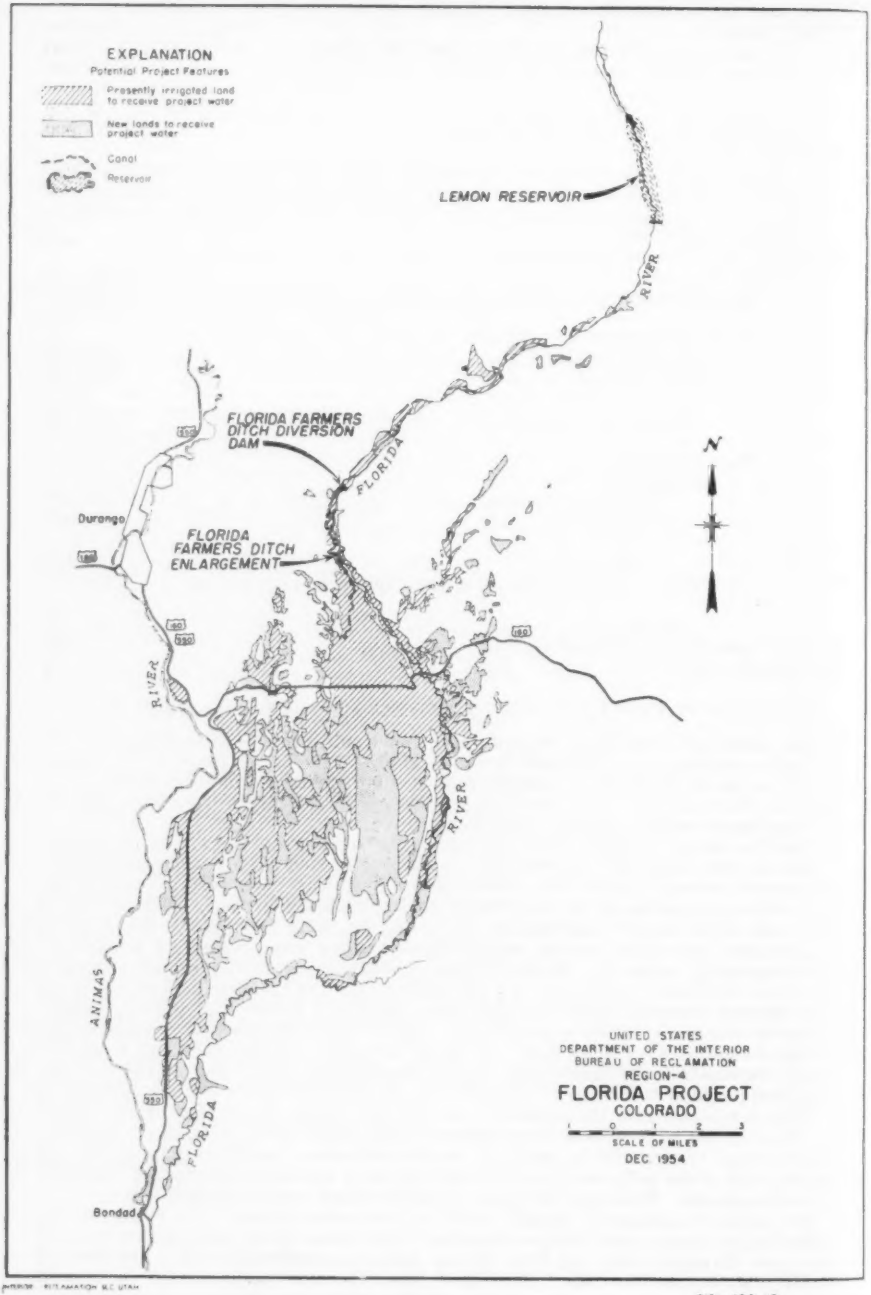
STATEMENT ON PINE RIVER PROJECT EXTENSION, COLORADO AND NEW MEXICO

The potential Pine River project extension would provide distribution canals to deliver water made available by the existing Pine River project to irrigate 15,150 acres of land now unirrigated in southwestern Colorado and northwestern New Mexico. Of this acreage 1,940 acres are within the boundaries of the existing Pine River Indian irrigation project.

The Pine River project, consisting of Vallecito Dam and Reservoir of 126,280 acre-feet active capacity on Pine River, was authorized for construction in 1937 to provide storage water for 69,000 acres and was substantially completed and placed in operation by the Bureau of Reclamation in 1941. About half of the lands to be served were under canals and partially irrigated at the time of construction and now receive supplemental water from Vallecito Reservoir. The remaining lands had no distribution facilities at the time of construction. Facilities for these lands were not included as part of the original project as it was thought that the works required were relatively minor and could be undertaken by the water users with private capital. The required works proved so costly, however, that they have not been privately constructed. As a result, canal systems for the lands that can be economically developed at the present time are planned for Federal construction as the Pine River project extension.

With development of the extension the irrigated lands would be utilized largely for the support of livestock enterprises as now practiced in the general locality. Major crops that would be produced on the extension lands are hay and small grains with some potatoes, pinto beans, and early maturing vegetables, and berries also grown. Principal livestock would be dairy cows and beef cattle.

The project extension would consist of the enlargement and extension of eight major canals and ditches diverting from Pine River, the construction of one new diversion dam on Pine River, and the construction of a number of small distribution laterals. Over half the extension lands would be served by enlargement and extension of the existing King consolidated canal and construction of a new diversion dam at the head of this canal. The other canals and ditches to be enlarged and extended include the Pine River canal and the Myers-Asher, Bennet and Myers, Bear Creek, and Pine River, Sullivan, Shroder


EXPLANATION
Potential Project Features
Presently irrigated land to receive project water
New lands to receive project water
Canal
Reservoir
LEMON RESERVOIR
RIVER
FLORIDA FARMERS DITCH DIVERSION DAM
FLORIDA
Durango
FLORIDA FARMERS DITCH ENLARGEMENT
160
550
RIVER
RIVER
ANIMAS
FLORIDA
Bondad
N
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
REGION-4
FLORIDA PROJECT
COLORADO
SCALE OF MILES
DEC. 1954

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extension, and Thompson Epperson ditches. A period of 3 to 4 years would be required to complete definite plan investigations and construction of the extension works.

Preliminary land classification surveys indicate the extension lands to be suitable for sustained crop production under irrigation farming. A detailed classification is necessary to confirm the suitability of all the lands.

Water-supply studies, based on records of streamflows as they have occurred in the past, indicate that an adequate water supply would be available for the development from direct flows and storage water from the existing Vallecito Reservoir. A water right for the project can be obtained under Colorado and New Mexico State laws.

This statement is based on the physical plan of development presented in the report on Pine River project extension, Colorado and New Mexico, dated January 1951—a supplement to the Colorado River storage project report dated December 1950. Results of current (January 1953) Bureau of Reclamation estimates for this development plan are summarized in the attached project summary tabulation.

Summary data, Pine River project extension, Colorado-New Mexico

Irrigated acreage:

	Colorado	New Mexico	Total
New lands:			
Indian	1,940		1,940
Non-Indian	12,580	630	13,210
Total	14,520	630	15,150

Principal agricultural production: Alfalfa, grains, dairy cows and beef.

Water supply:	*Acre-feet*
Average annual increase in direct-flow diversions	31,550
Average annual increase in storage yield	13,900
Total	[1] 45,450

Storage at existing Vallecito Reservoir of 126,280 acre-feet active capacity of which some 20 to 25 percent of such capacity would be available to the Pine River project extension lands.

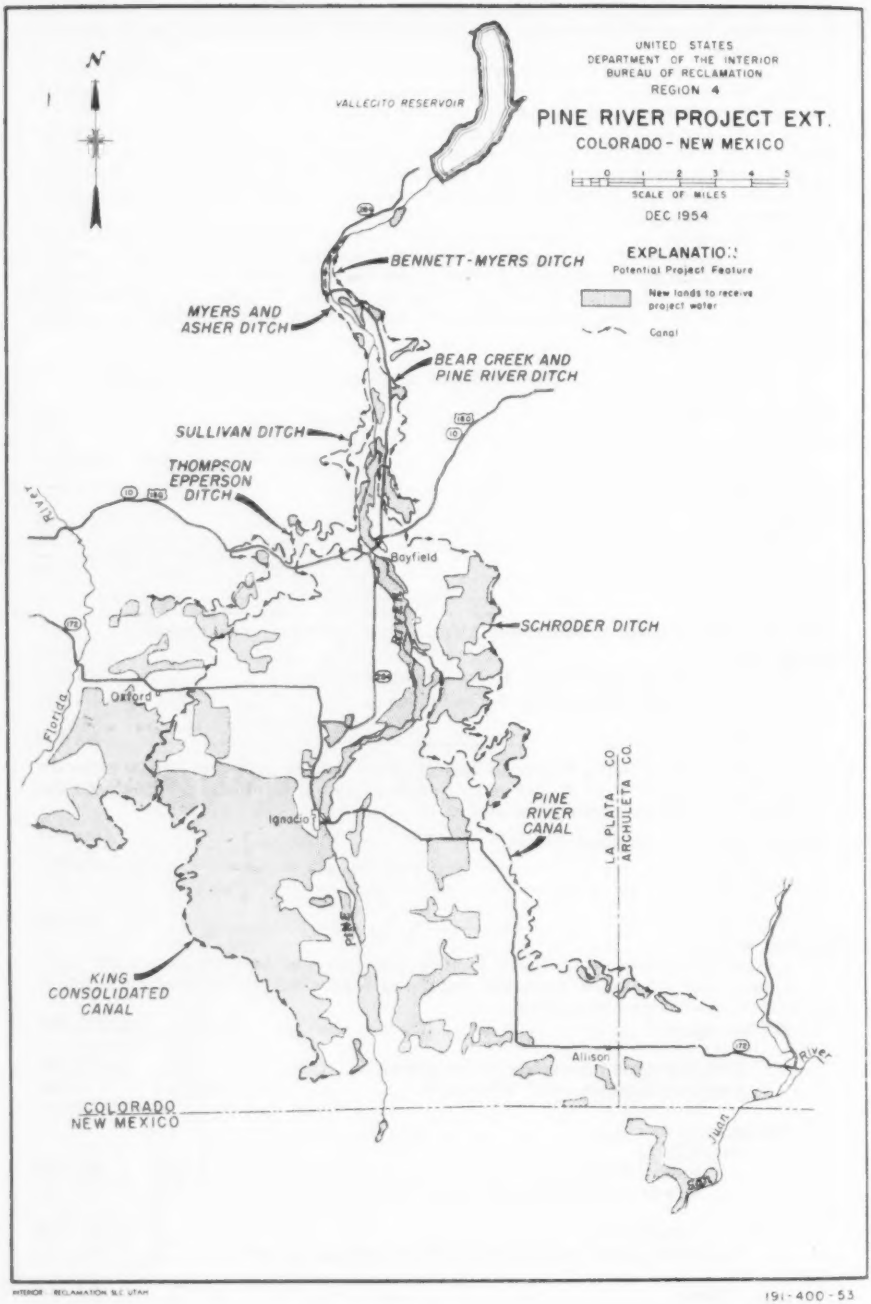
Stream depletion (average annual):	*Acre-feet*
Colorado	27,200
New Mexico	1,100
Total	28,300

Project works:

New construction features include enlargement and extension of eight canals and ditches, a diversion dam, and a number of distribution laterals.

Construction cost and repayment:	
Estimated cost	$5,027,000
Reimbursable allocation to irrigation	5,027,000
Nonreimbursable cost allocation	None
Repayment by:	
Irrigation:	
Indian lands	262,000
Non-Indian lands	1,783,000
Subtotal	2,045,000
Power revenues from Colorado River storage project	2,982,000
Total	5,027,000
Annual operation, maintenance, and replacement costs	18,950
Benefit-cost ratio	2.2 to 1

[1] Return flow of 4,250 acre-feet would also be diverted, making a total diversion of water by extension lands of 49,700 acre-feet.



INTERIOR - RECLAMATION SLC UTAH

191-400-53

STATEMENT ON EMERY COUNTY PROJECT, UTAH

The potential Emery County project is planned primarily to improve the irrigation water supply and thus better the agricultural production of 24,080 acres of land in Emery County in east-central Utah near the towns of Huntington, Castle Dale, and Orangeville. The project is in the Green River Basin, a part of the upper Colorado River Basin.

The general type of farming now practiced in the area would be continued with project development. Agriculture would continue to center around the livestock industry with more than 90 percent of the irrigated area producing hay and grains. The increased production in livestock feed would permit increased production on the farm of beef, sheep, pork, and dairy products.

Principal construction features of the project would be Joes Valley Dam and Reservoir, with a total capacity of 57,900 acre-feet, to store water on Cottonwood Creek, the Swasey diversion dam on Cottonwood Creek, 10 miles downstream from Joes Valley, and the 17-mile Cottonwood Creek-Huntington Canal, with an initial capacity of 250 second-feet, heading at the Swasey diversion dam. Some canal laterals and drains would be constructed. Existing irrigation facilities in the area would be utilized as fully as practicable. Recreational facilities would be provided at the Joes Valley Reservoir. A construction period of 3 to 5 years, including completion of definite plan investigations, would be required to complete construction of the project.

The project would make available an average of 31,400 acre-feet of water annually for 24,080 acres of land in Emery County, including 20,450 acres now irrigated with only a partial supply and 3,630 acres not now irrigated. In addition, about 1,000 acre-feet of late-season water annually would be made available by exchange for transmountain diversion to lands in the Bonneville Basin now partially irrigated by the Ephraim and Spring City divisions of the existing Sanpete project. Recreational and scenic attractions at Joes Valley Reservoir site would be developed as planned by the National Park Service.

A preliminary land classification survey indicates that the project lands would be suitable for sustained production of crops under irrigation farming. A detailed classification would be necessary to confirm the suitability of the lands.

Water-supply studies, based on records of streamflows as they have occurred in the past, indicate that an adequate irrigation supply would be available for the project with permissible shortages in occasional drought years. Water rights for the project can be obtained under Utah State law.

This statement is based on the physical plan of project development presented in the Bureau of Reclamation report on the Emery County project, Utah, dated February 1951, a supplement to the Colorado River storage project report dated December 1950. Results of current (January 1953) Bureau of Reclamation estimates for this project plan are summarized in the attached project summary tabulation.

Summary data, Emery County project, Utah

Irrigated acreage:	
New land	3,630
Supplemental	20,450
Total	24,080
Principal agricultural production: Alfalfa, grain, peaches, vegetables, dairy cows, beef cattle, and sheep.	
Water supply:	*Acre-feet*
Average annual increase in direct flow diversions	3,900
Average annual increase in storage yield	28,500
Total	32,400
Stream depletion (average annual)	15,500
Project works:	
Joes Valley Dam and Reservoir, with a total capacity of 57,000 acre-feet, a diversion dam, the 17-mile Cottonwood Creek-Huntington Canal with 250 second-feet initial capacity, and some canal laterals and drains are the principal construction features.	

Summary data, Emery County project, Utah—Continued

Construction cost and repayment:	
Estimated cost	$9,865,500
Reimbursable cost allocated to irrigation	9,636,500
Nonreimbursable cost allocated to recreation	229,000
Repayment by:	
Irrigation water users	3,715,000
Power revenues from Colorado River storage project	5,921,500
Total	9,636,500
Annual operation, maintenance, and replacement costs:	
Irrigation	21,870
Recreation	15,110
Total	36,980
Benefit-cost ratio	1.38 to 1

STATEMENT ON CENTRAL UTAH PROJECT, UTAH

The potential central Utah project would provide for the multiple-purpose use in Utah of water tributary to the Colorado River. Under the general plan of development, streams draining the southern slope of the Uinta Mountains in the Uinta Basin in northeastern Utah would be intercepted and conveyed westerly by gravity flow through the Wasatch Mountains to the Bonneville Basin. The water would be collected by an aqueduct leading to a storage reservoir high in the Wasatch Mountains. From the reservoir the water would drop through a series of hydroelectric powerplants before being used for irrigation, municipal, and industrial purposes. Replacement water and water for additional development in the Uinta Basin would be provided by a major diversion from the Green River and by smaller developments on local streams.

The project would serve an area along the eastern border of the Bonneville Basin. This area, the most highly developed region in Utah, includes the communities of Salt Lake City, Provo, Heber, Spanish Fork, Payson, Nephi, Richfield, Delta, and Fillmore. The flow of small local streams, practically the only source of water, falls far short of irrigation requirements.

In contrast to the Bonneville Basin, the Uinta Basin has abundant water resources as compared with the land resources. Streams flowing south from the Uinta Mountains—the Duchesne River and its major tributaries, together with Ashley Creek and Brush Creek—produce more than ample water for irrigation.

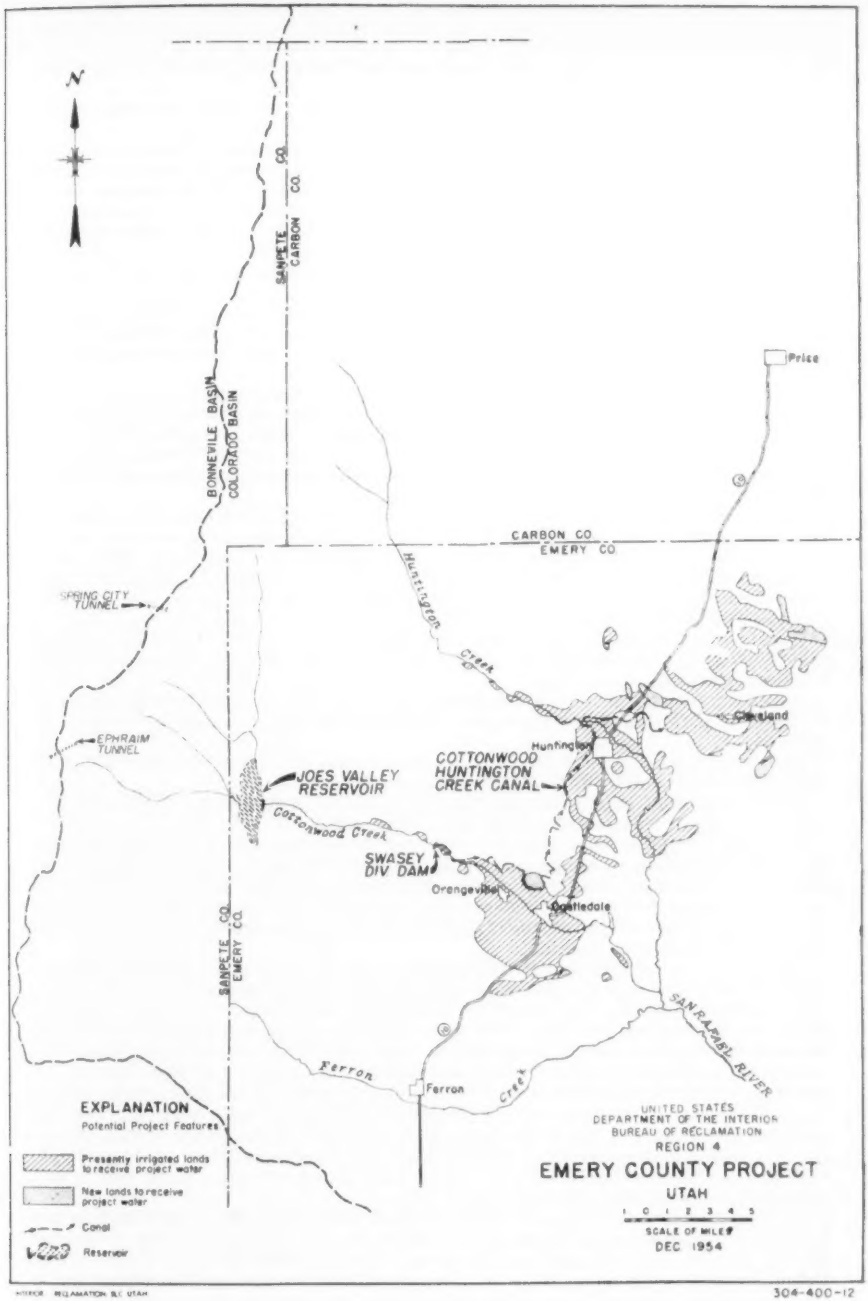
The project is of such magnitude it has been planned in two parts—the initial phase, a unified portion that could be developed and operate independently, and the ultimate phase. The two phases combined made up the comprehensive plan. Detailed investigations have been made only on the initial phase.

INITIAL PHASE OF PROJECT

In the initial phase of the project only Rock Creek and Uinta Mountain streams west of Rock Creek would be diverted into the Bonneville Basin where development would be limited to areas between Salt Lake City and Nephi. Initial phase development in the Uinta Basin would include the Jensen, Vernal, Upalco, and Duchesne River areas.

The initial phase of the project would provide for the irrigation of 28,540 acres of new land and 131,800 acres now irrigated but in need of more water. Full seasonal regulation would be provided for 42,600 acres of land in the Duchesne River area, more than half of which is owned by Indians or has been acquired from them. Forty-eight thousand, eight hundred acre-feet of water would be provided annually for municipal, industrial, and other miscellaneous uses. Powerplants with an installed capacity of 61,000 kilowatts would generate aproximately 373 million kolowatt-hours of electric energy annually. Aproximately 2.2 million kilowatt-hours of energy would be required by the project for irrigation and drainage pumping. Central Utah project powerplants would be interconnected with plants of the Colorado River storage project.

Preliminary land-classification surveys of the project lands indicate that they would be suitable for sustained crop production under irrigation farming.



INTERIOR RECLAMATION SLC UTAH

304-400-12

The potential Strawberry aqueduct would intercept flows of Rock Creek, Hades Creek, Wolf Creek, West Fork of the Duchesne River, Currant Creek, Layout Creek, and Water Hollow. Reservoirs to regulate inflow to the aqueduct would be provided on Rock Creek (upper Stillwater), West Fork of the Duchesne River (Vat), and Currant Creek (Currant Creek).

The existing Strawberry Reservoir, terminus of the Strawberry aqueduct, would be enlarged through construction of the Soldier Creek Dam.

The existing outlet tunnel from the Strawberry Reservoir would be enlarged Below the tunnel outlet would be constructed the Old West powerplant, Sixth Water aqueduct, Hammock powerplant, Tanner powerplant, Monks Hollow Dam, the Wasatch aqueduct as far as York Ridge near Santaquin, and the Castilla powerplant. The Mona-Nephi Canal would be constructed from York Ridge to Salt Creek near Nephi. The Mona Reservoir would be enlarged, the Elberta Service Pipeline and the existing Elberta Canal would be enlarged to distribute water from Mona Reservoir.

Use of Provo River water through exchange would require Bates Dam on Provo River, Hobble Creek Dam on Little Hobble Creek, the West Valley Canal, and the Front Dam. Provo Bay would be diked and drained and the upper 7 miles of the Jordan River channel would be enlarged.

An exchange of water between the Bates Reservoir and numerous small storage reservoirs on the upper Provo River would be made to provide supplemental water to areas in the vicinity of Francis and Heber City. The Wallsburg area would be served by a similar exchange in Hobble Creek Reservoir. A dam would be constructed creating Round Knoll Lake for recreational and fish and wildlife purposes.

New project works to provide water for replacement and expanded irrigation and munipical use in the Uinta Basin would include Hanna Reservoir on the North Fork of Duchesne River, Starvation Reservoir on Strawberry River with a feeder canal from the Duchesne River, the Upalco Reservoir offstream from Lake Fork River, the Stanaker Reservoir with a feeder canal from Ashley Creek, and the Tyzack Reservoir on Brush Creek.

Construction of some new distribution laterals and drains would be required where existing facilities are not adequate to serve the area and where new lands are developed.

Necessary distribution and treatment facilities for municipal and industrial water within the communities would be constructed and financed by local interests.

Transmission lines for delivery of project power would be constructed to Salt Lake City on the north and to Manti on the south.

Facilities would be constructed for development of fish and wildlife, recreation, and forest resources in general as recommended.

Features would be constructed in an orderly sequence and as water became available irrigation development would be undertaken at different times in 13 areas or blocks, extending over a 13-year period, municipal and industrial water would be supplied in 3 different areas with construction extending over a 7-year period and construction of the 4 hydroelectric plants would require 8 years before reaching full production.

The operation of various existing facilities would require modification for correlation with the construction and operation of works planned for the central Utah project. Among the principal features in the Bonneville Basin affected would be the Strawberry Reservoir outlet tunnel, canals, and powerplants of the Strawberry Valley project; Deer Creek Reservoir, Provo Reservoir Canal, and Salt Lake aqueduct of the Provo River project; Utah Lake; and Mono Reservoir. Principal facilities in the Uinta Basin similarly affected would include Strawberry Reservoir of the Strawberry Valley project, Moon Lake and Midview Reservoirs and canals of the Moon Lake project, works of the Uinta Indian irrigation project, and various other structures on the Duchesne River, Ashley Creek, and Brush Creek systems. There would be a minor effect on some public and private power facilities in both basins.

This statement on the central Utah project, except as otherwise noted in the following paragraphs, is based on the physical plan of development presented in the Bureau of Reclamation report on Central Utah Project, Utah, dated February 1951, a supplement to the Colorado River Storage project report dated December 1950. Significant modifications may be found in the project plan during the definite planning stage of the investigation.

Since preparation of the 1951 report, the communities in eastern Duchesne County have constructed a municipal water pipeline and this feature would therefore be excluded from the project. As a result of eliminating the pipeline, about 2,300 acre-feet of Upalco Reservoir water is considered as a supplemental supply to 2,300 additional acres of land in the Upalco area. A refinement of the water supply studies for lands in the Duchesne River area—Indian and white owned—shows that 4,070 acres of "white lands" formerly considered as receiving replacement water would receive supplemental water instead. Allowances for these revisions in plan are incorporated in the results of current estimates as shown on page 6.

Results of current (January 1953) estimates are shown on the following two summary data sheets.

Summary data, Central Utah project initial phase, Utah

Irrigated acreage:

New land	28,540
Supplemental	131,840
Total	160,380

Principal agricultural production:

Alfalfa, grain, fruit, vegetables, sugar beets, tomatoes, dairy cows, beef cattle, and sheep.

Water supply: Average annual increase in supply (acre-feet):

Purpose	Uinta Basin	Bonneville Basin	Total
Irrigation:			
Direct flow		None	
Return flow and salvage		31,500	
Storage yield		97,500	
Subtotal	[1] 46,200	129,000	175,000
Municipal and industrial:			
Direct flow		None	
Storage		44,300	
Subtotal	[1] 4,500	44,300	48,800
Project summary:			
Direct flow		None	
Return flow and salvage		31,500	
Storage yield		141,800	
Total	[1] 50,700	173,300	224,000
Stream depletion (Colorado River)	47,600	141,800	189,400

[1] Water supplied by direct flow and storage.

Project works:

The principal project features would include construction of the 36.8-mile-long Strawberry aqueduct along the south slope of the Uinta Mountains intercepting Uinta Basin streams as far east as Rock Creek, enlargement of the Strawberry Reservoir through construction of the Soldier Creek Dam, an enlargement of the Strawberry Reservoir tunnel, 4 powerplants with a combined generating capacity of 61,000 kilowatts, numerous reservoirs including 5 with capacities over 30,000 acre-feet:

Total Capacity

	Acre-feet
Starvation Reservoir	160,000
Upper Stillwater Reservoir	31,500
Strawberry Reservoir	1,370,000
Stanaker Reservoir	37,000
Bates Reservoir	65,000

Summary data, Central Utah project initial phase, Utah—Continued

Project works—Continued	
Aqueducts (including the 28.4-mile long Wasatch), and canals and distribution systems as necessary to deliver and utilize the increased water supply. Drainage would be provided when necessary.	
Construction cost and repayment-initial phase:	
Estimated cost:	$231,044,000
Reimbursable cost allocated to:	
Irrigation	127,354,000
Power	46,699,000
Municipal and industrial water	45,500,000
Ultimate development	5,500,000
Total	225,053,000
Nonreimbursable cost allocated to:	
Flood control	3,113,000
Recreation	2,830,000
Forest resource development	48,000
Total	5,991,000
Repayment of reimbursable costs by:	
Irrigation costs:	
From water users	15,191,000
From central Utah project power revenue	[1] 27,838,000
From Colorado River storage project power revenues	[2] 84,325,000
Total	127,354,000
Power costs from project power revenues	46,699,000
Municipal and industrial water costs by users	45,500,000
Total repayment	219,553,000
Annual operation, maintenance, and replacement costs:	
Irrigation	253,930
Power	445,900
Municipal and industrial water	69,160
Total	768,990
Benefit-cost ratio	1.23 to 1

[1] Available from net power revenues from central Utah project powerplants over a 17-year period following payment of CUP power costs but prior to the end of the 50-year repayment period on the last irrigation block.

[2] A 1-mill tax under the Utah Water Conservancy Act could appreciably reduce this amount.

THE COMPREHENSIVE PLAN

When fully developed the Central Utah project would provide a full irrigation water supply for 200,000 acres of new land, a supplemental supply for 239,900 acres now inadequately irrigated, and 48,800 acre-feet of water to meet foreseeable demands for municipal, industrial, and other miscellaneuos purposes. Project powerplants would have an installed capacity of 249,000 kilowatts and generate almost 1.2 billion kilowatt-hours of electric energy annually. Additional power potentialities exist and will be evaluated as the investigations progress.

The flow of all important streams on the south slope of the Uinta Mountains would be intercepted by the potential 110-mile aqueduct and conveyed to the Strawberry Reservoir. The flow of Carter Creek on the Uintas' northern slope would be brought to the southern slope. The western 36.8 miles of the

aqueduct, extending from Rock Creek to the Strawberry Reservoir, would consist of two parallel bores.

Water would be released from the Strawberry Reservoir to the Bonneville Basin through two tunnels. In its 12-mile descent to the Bonneville Basin floor, a drop of about 2,600 feet, the water, including the water of the existing Strawberry Valley project, would pass through a series of hydroelectric powerplants, and then would be divided, part continuing to the south and part being diverted to the north.

During the irrigation season the water continuing south would be distributed for irrigation and other purposes in areas as far south as Fillmore. During the nonirrigation season water used through the powerplants and continuing south would be stored in the Dyer Reservoir for irrigation of the lands in the vicinity of Fillmore. Water of the Sevier River could be stored in existing reservoirs by exchange and used for irrigation of lands along the upper reaches of the river, principally near Richfield and on the lower reaches near Delta.

Water diverted during the irrigation season to the north would be used for irrigation and other purposes in the area from Santaquin to Springville now partially served by the Strawberry Valley project. During the nonirrigation season releases would flow down Spanish Fork River to Utah Lake, replacing Provo River water stored in the potential Bates Reservoir on the Provo River and the potential Hobble Creek Reservoir, a tributary. Project water stored in Bates and Wallsburg Reservoir would be used for irrigation, municipal, and industrial purposes in the Heber-Francis-Wallsburg areas and in the Provo-Salt Lake City region as well as the western part of the Jordan River Valley.

Where practicable the project reservoirs would impound water for recreational and fish and wildlife purposes, thus providing partial compensation for damages to these purposes.

A dike would be constructed across the mouth of Provo Bay, an arm of Utah Lake, and the bay drained, reducing evaporation losses and reclaiming 9,340 acres of land. The diking of Goshen Bay of Utah Lake, authorized as a part of the Provo River project but not yet undertaken, would permit the south 26,000 acres of Utah Lake to be drained, reducing the average annual evaporation by 60,000 acre-feet.

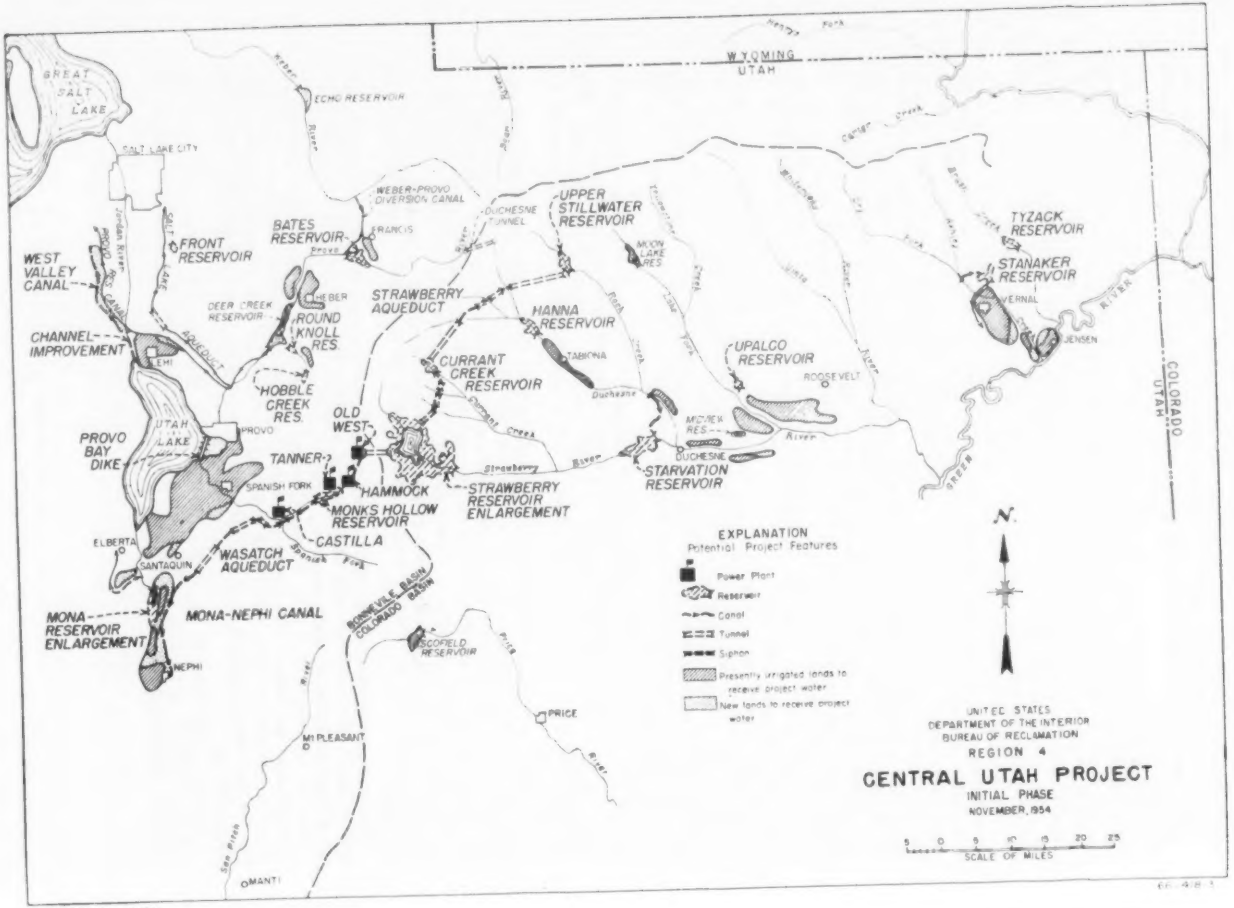
A 7-mile section of the Jordan River channel between Utah Lake and Jordan Narrows would be enlarged. The channel improvement was authorized as a part of the Provo River project. Improvement of the river channel from Jordan Narrows to Great Salt Lake is being investigated by the Corps of Engineers.

In order to replace water now used in the Uinta Basin that would be exported and to provide additional water for further development within this basin, water would be diverted from the Flaming Gorge Reservoir that would be constructed on the Green River as a feature of the Colorado River storage project. Under an alternative plan of development Green River water could be supplied to the Uinta Basin from Echo Park Reservoir, another potential feature of the Colorado River storage project and would be pumped an average lift of 170 feet.

Project powerplants and transmission systems would be interconnected with the system proposed for transmission of electric energy produced by plants of the Colorado River storage project.

Rights to flows of Uinta Basin streams have been acquired by both white settlers and Indians. The Central Utah project would largely control the Uinta Basin's surplus waters. Much of the water would be exported, but that needed for further development in the Uinta Basin would be provided directly from the Green River.

Annual depletions to the Colorado River at the sites of use are expected to average 800,600 acre-feet, or one-half of the water available to Utah under the terms of the upper Colorado River Basin compact.


WYOMING
UTAH
GREAT SALT LAKE
SALT LAKE CITY
ECHO RESERVOIR
WEBER-PROVO DIVERSION CANAL
BATES RESERVOIR
FRANKLIN
FRONT RESERVOIR
WEST VALLEY CANAL
DEER CREEK RESERVOIR
HEBER
ROUND KNOLL RES.
CHANNEL IMPROVEMENT
HOBBLE CREEK RES.
PROVO BAY DIKE
UTAH LAKE
PROVO
OLD WEST
TANNER
HAMMOCK
SPANISH FORK
MONK'S HOLLOW RESERVOIR
CASTILLA
ELBERTA
SANTAQUIN
WASATCH AQUEDUCT
MONA RESERVOIR ENLARGEMENT
MONA-NEPHI CANAL
NEPHI
BONNEVILLE BASIN COLORADO
SCOFIELD RESERVOIR
MT PLEASANT
PRICE
SAN PITCH RIVER
MANTI
STRAWBERRY AQUEDUCT
CURRANT CREEK RESERVOIR
STRAWBERRY RESERVOIR ENLARGEMENT
DUCHESNE TUNNEL
UPPER STILLWATER RESERVOIR
MOON LAKE RES.
HANNA RESERVOIR
TABIONA
MIDDLE RES.
DUCHESNE
STARVATION RESERVOIR
UPALCO RESERVOIR
ROOSEVELT
TYZACK RESERVOIR
STANAKER RESERVOIR
VERNAL
JENSEN
COLORADO UTAH
EXPLANATION
Potential Project Features
Power Plant
Reservoir
Canal
Tunnel
Siphon
Presently irrigated lands to receive project water
New lands to receive project water
N.
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
REGION 4
CENTRAL UTAH PROJECT
INITIAL PHASE
NOVEMBER, 1954
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SCALE OF MILES

STATEMENT ON HAMMOND PROJECT, NEW MEXICO

The potential Hammond project would divert waters of San Juan River to provide an irrigation supply for 3,670 acres of arable land now unirrigated. The lands lie along the south side of the river in a narrow 20-mile strip opposite the towns of Blanco, Bloomfield, and Farmington, in northwestern New Mexico.

The principal crops that would be grown on the lands with project development would be alfalfa, apples, corn, beans, and barley. Most of the farms are of the fruit-crop and dairy-field crop types.

Preliminary land classification surveys indicate that the lands would be suitable for sustained crop production under irrigation farming. A detailed classification would be necessary to confirm the suitability of all the lands.

Water supply studies, based on records of streamflows as they have occurred in the past, indicate that an adequate irrigation supply of 18,400 acre-feet annually would be available for the project from direct flows with permissible shortages occurring in occasional drought years. A water right for the project can be obtained under New Mexico State law.

Project works would include the Hammond diversion dam on San Juan River, a 28-mile mail gravity canal, a hydraulic turbine-driven pumping plant, the East Highline lateral, the West Highline lateral, minor distribution ditches, and a drainage system. A period of about 2 or 3 years would be required to complete definite plan investigations and construction of project works except the drains. A few years' operation of the project would be necessary to determine the extent of drainage actually required.

This statement is based on the physical plan of project development presented in the Bureau of Reclamation report on the Hammond project, New Mexico, dated November 1950, a supplement to the Colorado River storage project report dated December 1950. Results of current (January 1953) estimates for this project plan are summarized in the attached project summary tabulation.

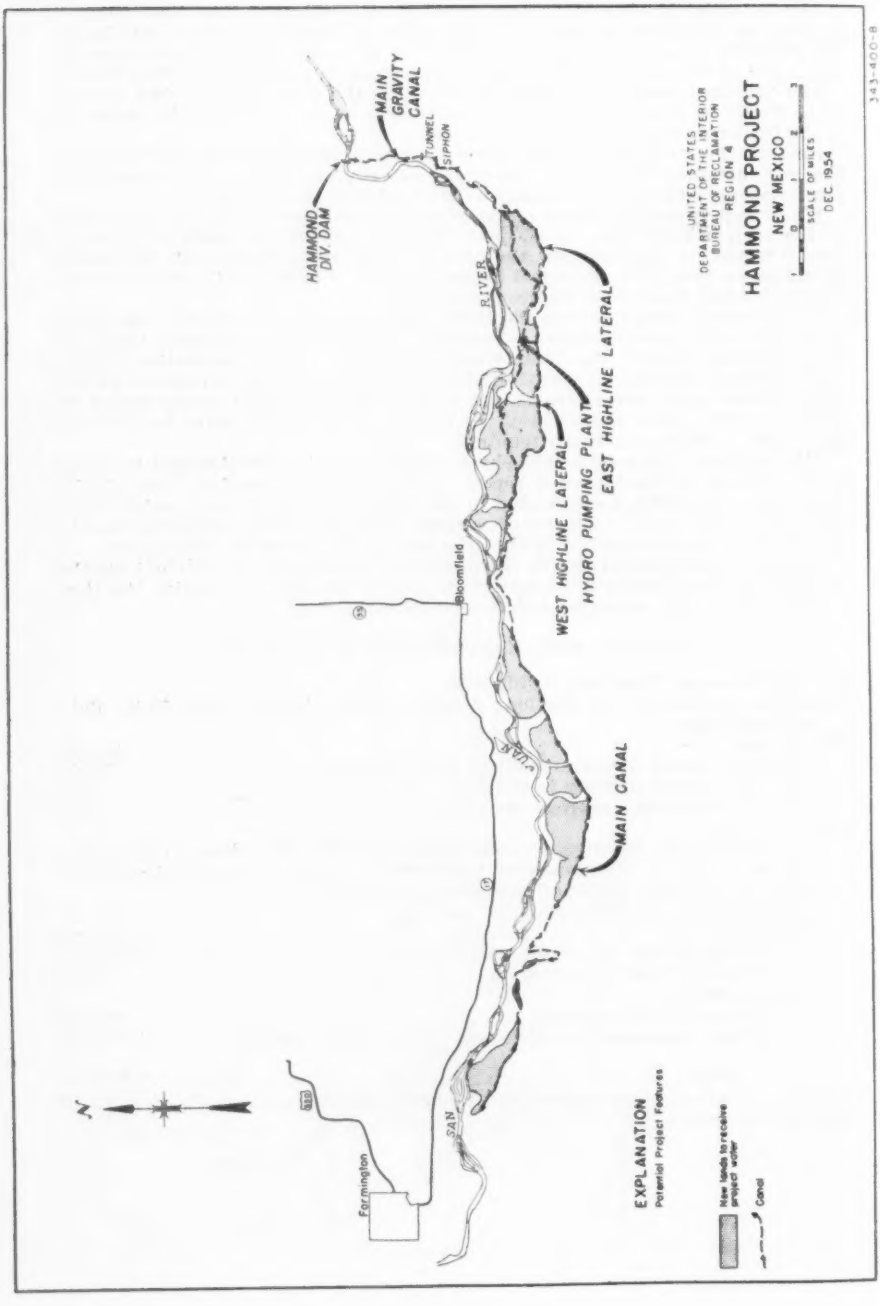
Studies of the potenial nearby Navajo project subsequent to 1950 indicate that it might be found desirable to materially modify the plan for serving the Hammond project lands during the definite plan investigations.

Summary data, Hammond project, New Mexico

Irrigated acreage: New land, 3,670 acres.

Principal agricultural production: Alfalfa, grains, beans, some fruit; dairy cows and sheep.

Water supply:	*Acre-feet*
Average annual increase in direct flow diversion	18,400
Average annual increase in storage yield	None
Stream depletion (average annual)	7,900
Project works:	
Construction features include Hammond diversion dam on San Juan River, a 28-mile 86-second-foot main gravity canal, a small hydraulic turbine-driven pump, distribution laterals, and drains.	
Construction cost and repayment:	
Estimated cost	$2,302,000
Reinmburable allocation to irrigation	2,302,000
Nonreimbursable allocation	None
Repayment by—	
Irrigation water users	370,000
Power revenues from Colorado River storage project	1,932,000
Total	2,302,000
Annual operation, maintenance, and replacement costs	16,100
Benefit-cost ratio	2.8 to 1


HAMMOND DIV. DAM
MAIN GRAVITY CANAL
TUNNEL
SIPHON
RIVER
WEST HIGHLINE LATERAL
HYDRO PUMPING PLANT
EAST HIGHLINE LATERAL
Bloomfield
MAIN CANAL
SAN
Farmington
N
EXPLANATION
Potential Project Features
New lands to receive project water
Canal
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
REGION 4
HAMMOND PROJECT
NEW MEXICO
SCALE OF MILES
DEC. 1954
343-400-8

Statement on Eden Project, Wyoming

When completed the Eden project in southwestern Wyoming will divert water from the Big and Little Sandy Creeks in the upper Colorado River Basin to irrigate 10,660 acres of arable lands not now irrigated and will replace or otherwise rehabilitate the major features of the irrigation system that heretofore was utilized to irrigate 9,540 acres.

Climatically adapted crops in the area, such as alfalfa, pasture grasses, and small grains, will be produced on the project lands largely in conjunction with livestock operations centered around dairy cows, beef, and farm flocks of sheep and of chickens.

Construction of the Eden project was originally approved by the President on September 18, 1940, as a water conservation and utilization project under the act of August 11, 1939 (53 Stat. 1418). Work on the project was about 16 percent completed when stopped by order of the War Production Board in December 1942. Completion of the project was subsequently authorized by act of June 28, 1949 (Public Law 132, 81st Cong., 1st sess.). Construction of the project under the latter authorization is now well advanced with two major features of the project already completed and work currently under way on some of the other project features. The latter act provided for "such modification in the physical features as the Secretary of the Interior may find will result in greater engineering and economic feasibility: *Provided*, That of the construction costs of the irrigation features of the project not less than $1,500,000 for the project of twenty thousand irrigable acres, or a proportionate part thereof based on the actual irrigable area as determined and announced by the Secretary of the Interior upon completion of the project, shall be reimbursed by the water users in not to exceed sixty years. * * * *Provided further*, That construction costs of the irrigation features of the project which are not hereby made reimbursable by the water users shall be set aside in a special account against which net revenues derived from the sale of power generated at the hydroelectric plants of the Colorado River Storage project in the Upper Basin shall be charged when such plants are constructed."

The current plan of the project is covered in a definite plan report prepared by the Bureau of Reclamation and dated May 1953. Construction features of the project include:

Big Sandy Dam and dikes (now completed) on Big Sandy Creek to form Big Sandy Reservoir of 39,700 acre-feet total storage capacity.

Means Canal (now completed) to convey water from Big Sandy Reservoir to the West Side lateral and to the existing Eden Canal.

West Side lateral to serve lands on the west side of Big Sandy Creek.

Eden Creek enlargement and relocation below the terminus of the Means Canal to serve lands east of Big Sandy Creek.

Little Sandy Canal rehabilitation and extension to connect with the upper section of the Eden Canal.

Enlargement of existing lateral system served by Eden Canal to serve both presently irrigated and new lands under that canal.

Project drainage system.

A detailed classification survey shows the lands of the project to be suitable for sustained crop production under irrigation farming.

Water supply studies, based on records of streamflows as they have occurred in the past, indicate that an adequate irrigation supply would be available for the project area from direct flows and storage with permissible shortages in occasional drought years.

Project construction costs based on January 1953 prices are estimated at $7,287,000. The project repayment was established by the project authorizing act of June 28, 1949, as $1,500,000 to be repaid over 60 years. This amount deducted from total project costs leaves $5,787,000 to be repaid from Colorado River storage project net power revenues under the general repayment plan of the latter project and in accordance with the Eden project authorizing act of 1949.

Data on the project are summarized in the attached tabulation.

Summary data, Eden project, Wyoming

Irrigated acreage:	*Acres*
New land	10,660
Supplemental	9,540
Total	20,200
Principal agricultural production: Hay, pasture, dairy cows, sheep, beef.	
Water supply:	*Acre-feet*
Increase in average annual direct flow diversions	39,600
Increase in average annual storage yield	20,400
Total	60,000
Stream depletion (average annual)	32,400
Project works:	
Construction features include the Big Sandy Dam, Dikes, and Reservoir with 39,700 acre-feet total storage capacity (now completed), Means Canal (now completed) laterals and improvements in existing distribution system, along with drainage to serve the project area.	
Construction costs and repayment:	
Estimated cost	$7,287,000
Reimbursable cost allocated to irrigation	7,287,000
Nonreimbursable cost	None
Repayment by:	
Irrigation [1]	1,500,000
Power revenues from colorado River storage project	5,787,000
Total	7,287,000
Annual operation, maintenance, and replacement costs	40,400
Benefit-cost ratio	1.3 to 1

[1] Based on 60-year repayment period as provided under project authorizing act of 1949.

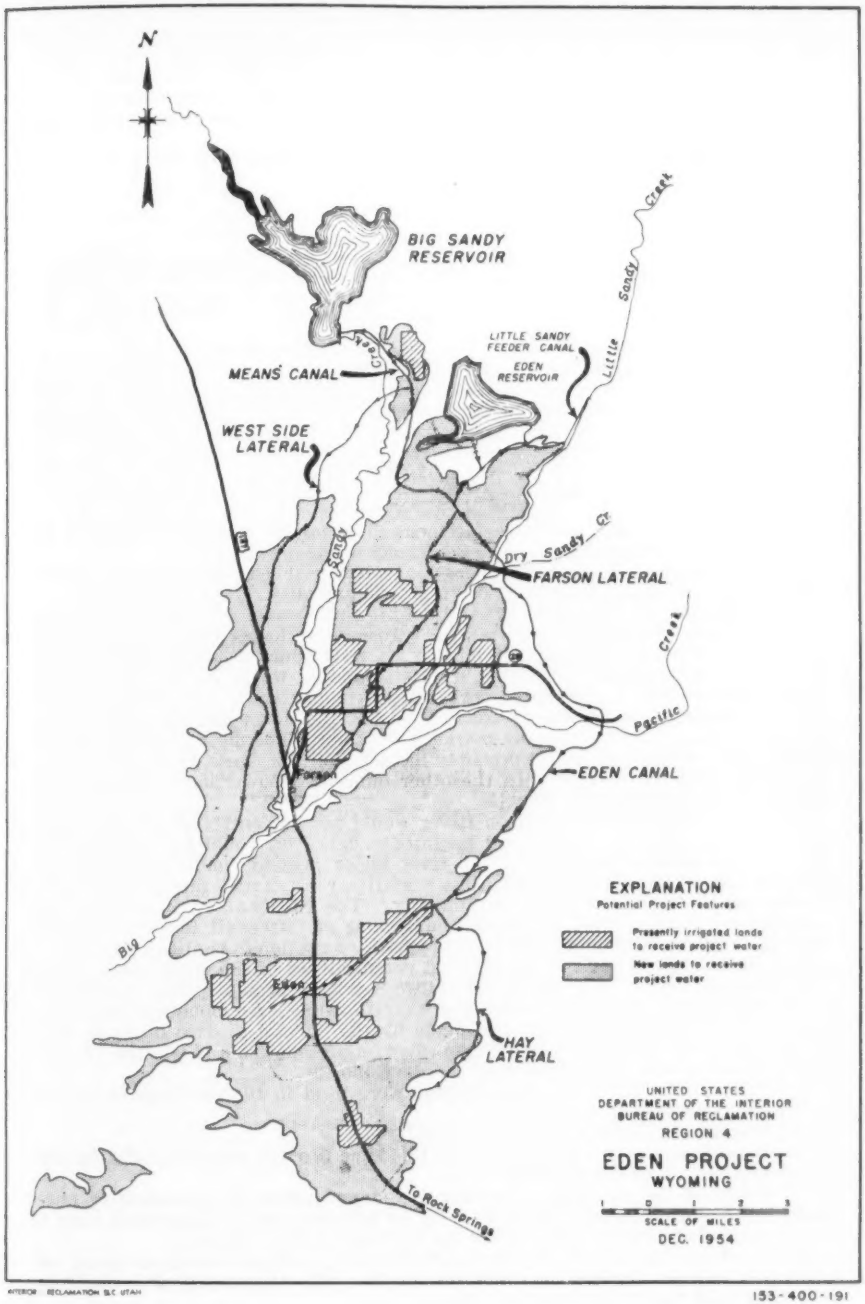
STATEMENT ON CURECANTI UNIT, COLORADO, OF COLORADO RIVER STORAGE PROJECT

(Modified plan)

The Curecanti unit of the Colorado River storage project is located on Gunnison River, a tributary of the Colorado River, in west-central Colorado. The report of the Colorado River storage project and participating projects of December 1950 included plans for development of the Curecanti and Crystal Reservoirs and powerplants. The Curecanti unit recommended in that report was for a reservoir capacity of 2,500,000 acre-feet. The State of Colorado requested that the reservoir water surface is limited to elevation 7,520 or a capacity of 940,000 acre-feet. As a result the committee reports on the bills before the last session of the Congress contained the recommendation of the State of Colorado that the Curecanti unit be limited accordingly. Since the cost of power produced by the smaller dam was somewhat higher than the cost of power produced by alternate means, we have endeavored to work out a plan for improving the economic feasibility of this unit.

Reconnaissance studies of a modified plan are now well advanced and indicate that a greater and more economical utilization of the power resources on the Gunnison River could be made by adding two dams and powerplants between the Curecanti and Crystal Reservoir sites. The resulting unit would consist of an integrated system of four dams and powerplants. It is planned primarily for hydroelectric development and would also provide benefits from flood control, recreation, and ultimately from irrigation and other uses dependent upon river regulation or replacement storage. The reservoirs would extend some 40 miles along a section of the Gunnison River between the town of Gunnison and the Black Canyon National Monument but would lie above and outside the boundary of the monument. Each of the features included in the unit under the modified plan would be dependent for maximum economy upon other features of the unit, and each feature would be justified economically for inclusion in the unit.

The Curecanti Reservoir would be formed by the Blue Mesa Dam. It would be the largest and uppermost of the four reservoirs in the system and would provide the major portion of the system's stream regulation. The three downstream reservoirs referred to as the Narrow Gauge, Morrow Point, and Crystal Reservoirs, in that order, would be primarily for development of power head with only nomi-



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nal active storage capacities. Sufficient active capacity, however, would be provided at the Morrow Point site for some seasonal regulation of stream inflows below Blue Mesa Dam. Small amounts of active capacity would also be necessary at the three downstream sites for successive reregulation of releases from upstream reservoirs to permit flexibility of power production in conformance with power load patterns. Releases from the Crystal Reservoir, the lowest site in the system, would be maintained to provide optimum use of water downstream for irrigation and other uses in addition to generation of power at the Crystal site.

Physical data and estimated reconnaissance construction costs of the principal features in the unit are shown below:

Dam and powerplant or other feature	Height of dam above stream bed (feet)	Reservoir capacity (acre-feet)		Installed generating capacity (kilowatts)	Estimated construction cost of dam and powerplants (July 1954 prices)
		Total	Active		
Blue Mesa	350	940,000	740,000	51,000	$36,500,000
Narrow Gauge	135	8,000	1,000	18,000	9,100,000
Morrow Point	260	82,000	42,000	60,000	20,700,000
Crystal	155	9,000	1,000	23,000	10,700,000
Transmission system					11,500,000
Total	900	1,039,000	784,000	152,000	88,500,000

Operation, maintenance, and replacement costs for the unit are estimated at a total of $863,000 annually.

Stream depletion (reservoir evaporation) attributable to development of the unit would total approximately 17,000 acre-feet annually.

An average of approximately 615 million kilowatt-hours of energy deliverable to power load centers after allowing for transmission losses would be produced annually. Of the total, about 213 million kilowatt hours would be produced at the Blue Mesa powerplant. Market studies show that the potential power could be marketed within a reasonable period after completion of construction. The plan is adaptable to scheduling construction of the dams and powerplants to conform in general with growing market conditions. The most practical initial construction of the unit would probably include the Blue Mesa Dam (Curecanti Reservoir) and powerplant with the other dams and powerplants added later consistent with power load growth.

All of the flows of the Gunnison River would not be controlled by the reservoirs of the unit. Flows of flood magnitude, however, could be reduced and much of the flood damage along the river under present conditions would be reduced. The Corps of Engineers has tentatively estimated that flood-control benefits would amount to $10,000 annually. The National Park Service has tentatively estimated that the recreational value of Curecanti Reservoir would amount to about $20,000 annually if adequate recreational facilities were provided. No evaluation of the recreational potentialities of the other three reservoirs has been made. The Fish and Wildlife Service is presently studying effects of the potential development on fish and wildlife values. No monetary appraisal has yet been made, but the studies made by the Service to date indicate that the development would have an adverse effect on present fish and wildlife values. The Service is therefore opposed to the development.

The following criteria and assumptions were used in the preliminary reconnaissance appraisal of the unit:

(*a*) Only direct power benefits are considered.

(*b*) No allocation of costs is made at this time to river regulation for future irrigation and other consumptive uses.

(*c*) Costs of the unit and of alternative steam power for comparative purposes are based on amortizing costs with an interest rate of 2.5 percent over a 50-year period of analysis. Taxes are not included in the analysis.

(*d*) Average firm-energy production deliverable to load centers is based on estimated 20-year depleted streamflows for the 1931–44 streamflow conditions and estimated power-transmission losses.

(*e*) Present worth of the estimated salvage value at the end of 50 years was deducted from construction costs in computing the benefit-cost ratio.

(*f*) Delta, Montrose, Grand Junction, Nucla, and Gunnison, Colo., were assumed as power market-load centers for the study.

General results of the reconnaissance appraisal on the above basis for the Curecanti Reservoir and Blue Mesa Dam and powerplant alone and for the overall Curecanti unit are summarized below.

	Scale of development	
	Curecanti Reservoir, Blue Mesa Dam, and powerplant alone	Curecanti unit (4 dams and powerplants)
Average cost per kilowatt-hour	9.4 mills.	6.5 mills.
Cost per kilowatt-hour of alternative steam power	9.0 mills.	8.3 mills.
Benefit-cost ratio	1.1 to 1.	1.4 to 1.

Although the reconnaissance studies indicate that the Blue Mesa powerplant when considered alone would have a benefit-cost ratio slightly greater than unity if allowance is made for salvage value, the average cost of energy would slightly exceed the cost of alternative steam power. On the other hand, the benefit-cost ratio for the overall Curecanti unit would be well over unity and the average cost of energy would be 22 percent less than the cost of alternative steam power.

Detailed studies are necessary to refine the economic scale of development and to confirm the present reconnaissance apprasial.

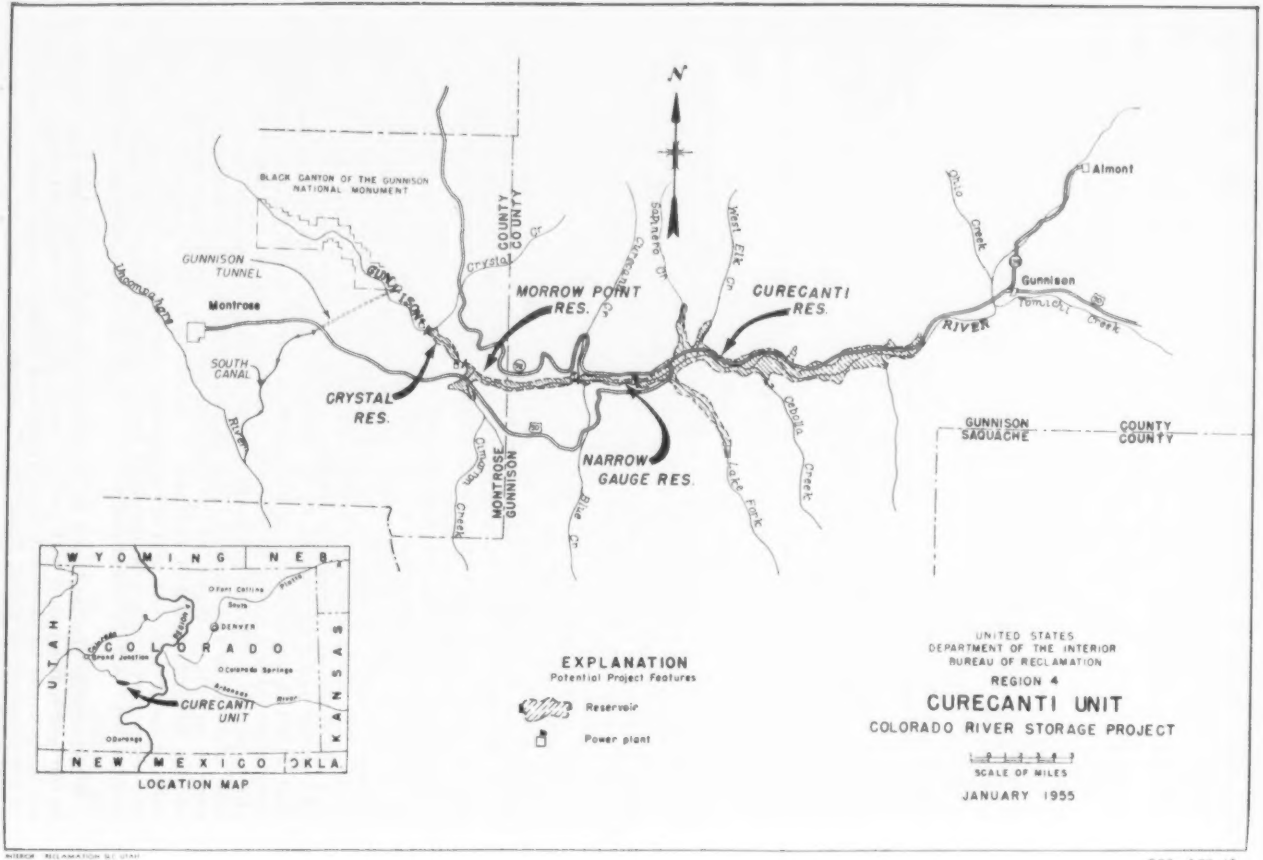
Statement on Gooseberry Project, Utah

The potential Gooseberry project would divert water from a headwater tributary in the Colorado River Basin to improve the irrigation water supply and thus the agricultural production, of 16,400 acres of arable lands in the Bonneville Basin in Sanpete County, central Utah. The project would also enchance recreational values for the population in the general vicinity of the project. A small net loss would probably result in fish and wildlife values. A net benefit to forest resource development would result from relocation of roads in connection with construction of project storage facilities.

The general type of farming now practiced in the area would be continued with project development. Agriculture would continue to center around the livestock industry with more than 95 percent of the irrigated area producing alfalfa, pasture, and small grains for livestock feed. Principal livestock would include dairy cows, beef cattle, and sheep.

Under the project plan surplus flows of Gooseberry Creek would be regulated at the 17,200 acre-foot capacity reservoir that would be constructed at the Mammoth site on the creek and would then be conveyed in the potential 2.4-mile Mammoth tunnel through the Colorado-Bonneville Basin Divide to Cottonwood Creek. The water would be diverted from Cottonwood Creek into existing canals and the potential Gooseberry Highline Canal for conveyance to project lands. The water would be distributed to individual farm tracts by existing laterals that would be rehabilitated as necessary as a part of the project development. Usable return flow would be collected in natural channels that would be cleaned and improved as part of the project. Drains would be provided for land with a high water table and the San Pitch River channel would be improved as necessary to provide an outlet for the drainage system. Boating, camping, and picnicking facilities would be provided at Mammoth Reservoir as recreational features of the project. As part of the reservoir construction, 3 miles of forest roads and sheep corral would be relocated and 2 miles of connecting roads would be constructed. A 3- to 5-year period would be required to complete construction of the project.

Water-supply studies based on records of streamflows as they have occurred in the past indicate that with project development the irrigation supply for project lands would be increased by an average of 14,000 acre-feet annually including 11,700 acre-feet of direct diversion of storage water and an increase of 2,300 acre-feet of usable return flows. Water rights for the project can be obtained under Utah State law.



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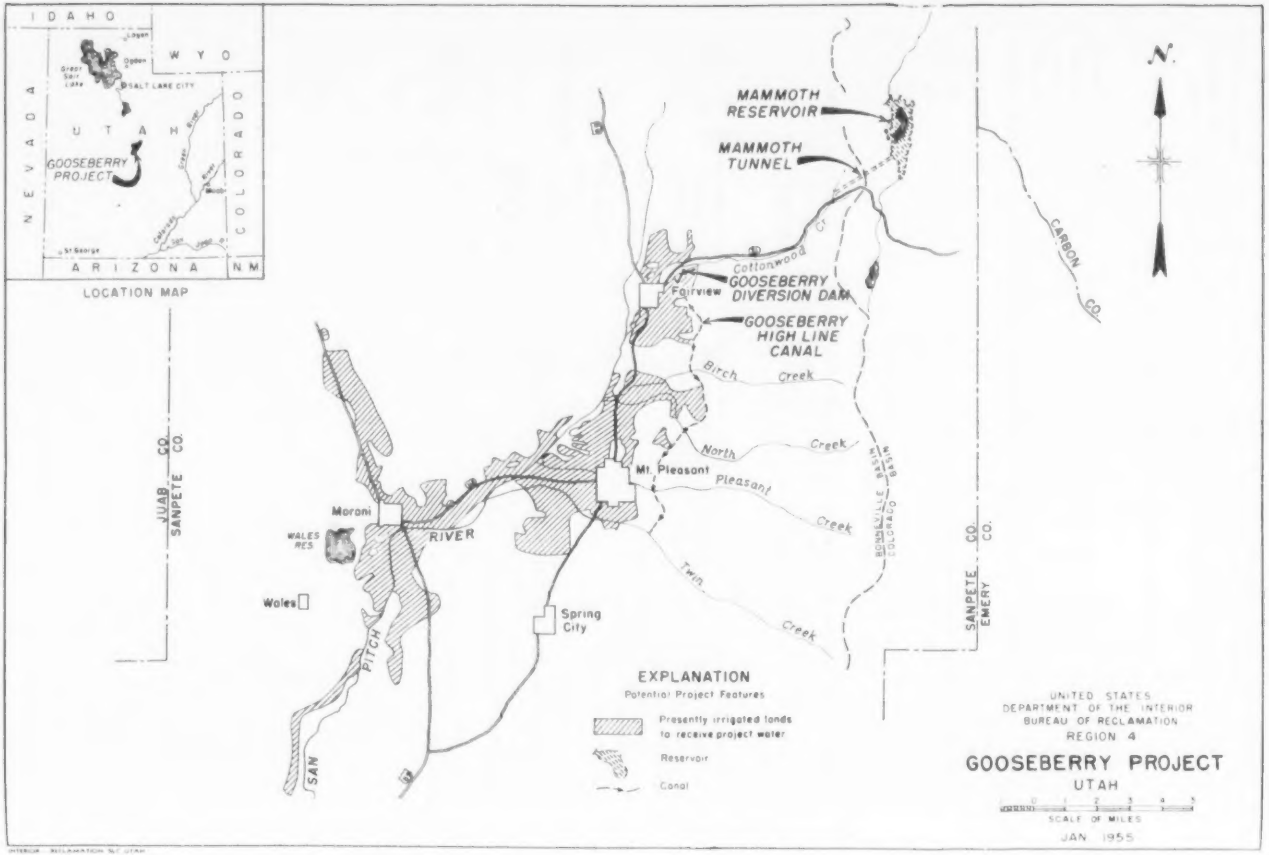
A preliminary land-classification survey indicates that the project lands would be suitable for sustained production of crops under irrigation farming. Detailed land classification would be required to confirm the suitability of all the lands.

Results of current (January 1953) Bureau of Reclamation estimates for the physical plan of the project, as covered in the Gooseberry project report dated January 1953, are summarized in the attached project summary tabulation.

Summary data, Gooseberry project, Utah

Irrigated acreage:		
New land		None
Supplemental		16,400
Total		16,400
Principal agricultural production: Alfalfa, pasture, grain, dairy cows, beef cattle, and sheep.		
Water supply:		*Acre-feet*
Average annual increase in return flow		2,300
Average annual increase in storage yield		11,700
Total		14,000
Stream depletion: 12,500 acre-feet.		
Project works:		
The construction features would include the Mammoth Dam and Reservoir with a total capacity of 17,200 acre-feet, the 2.4-mile Mammoth tunnel, the Gooseberry Highline Canal, and some rehabilitation of existing canals and laterals.		
Construction cost and repayment:		
Estimated cost		$5,760,500
Reimbursable cost allocated to irrigation		5,727,500
Nonreimbursable cost allocated to recreation		33,000
Repayment by:		
Irrigation water users	$2,375,000	
Power revenues from Colorado River storage project	3,352,500	
Total		5,727,500
Annual operation and maintenance and replacement costs:		
Irrigation	11,020	
Recreation	2,540	
Total		13,560
Benefit-cost ratio		1.2 to 1


IDAHO
WYO
NEVADA
UTAH
COLORADO
ARIZONA
NM
SALT LAKE CITY
GOOSEBERRY PROJECT
St George
LOCATION MAP
MAMMOTH RESERVOIR
MAMMOTH TUNNEL
Cottonwood Ck
Fairview
GOOSEBERRY DIVERSION DAM
GOOSEBERRY HIGH LINE CANAL
Birch Creek
North Creek
Mt. Pleasant
Pleasant Creek
Twin Creek
Moroni
WALES RES.
RIVER
Wales
Spring City
PITCH
SAN
UTAH CO.
SANPETE CO.
BONNEVILLE BASIN
COLORADO BASIN
CARBON CO.
SANPETE CO.
EMERY CO.
N
EXPLANATION
Potential Project Features
Presently irrigated lands to receive project water
Reservoir
Canal
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
REGION 4
GOOSEBERRY PROJECT
UTAH
SCALE OF MILES
JAN 1955
239-400-32

STATEMENT ON NAVAHO PROJECT, NEW MEXICO

The potential Navaho project (formerly called the Shiprock and South San Juan projects) would provide for the irrigation of about 137,250 acres of arable dry lands lying along the south side of San Juan River, a principal tributary of Colorado River, near the towns of Bloomfield, Farmington, and Shiprock in northwestern New Mexico. Of the lands that would be irrigated 109,000 acres are located in the Navaho Indian Reservation and 28,250 acres are outside the reservation. All the lands within the reservation and 1,660 acres outside the reservation are Indian-owned. Remaining lands outside the reservation are publicly owned or privately owned by non-Indians.

The general plan of the project includes the Navaho Dam and Reservoir on San Juan River of 1,450,000 acre-feet total capacity (778,000 acre-feet active), and a main highline canal to divert from the reservoir at a point near the dam and at an elevation about 270 feet above the stream bed. This main high line canal of 2,630 second-feet capacity would divert the water to a point about 29 miles downstream from Navaho Dam where the water would be dropped through a direct connected turbine pumping plant to a lower main canal that would extend westerly about 120 miles to serve the major portion of the project lands by gravity. The dropping water would energize the pump to lift a part of the water to serve the portion of the project lands inside and outside of the reservation that are too high to be served by the gravity diversion. A distribution system would extend beyond the pump lift to deliver the pumped water to the high lands. A system of drains would be provided as required to prevent seepage of project lands. The Navaho Reservoir would be used jointly by the Navaho and San Juan-Chama project. The latter project is a potential transmountain diversion to the Rio Grande Basin from the headwaters of the San Juan River.

Planning investigations of the Navaho project have been made jointly by the Bureau of Indian Affairs and region 4 of the Bureau of Reclamation. The project is an integral part of the Indian Affairs' program to bring relief to the Navaho Indians from their very low family incomes and to make them self-sustaining.

Navaho project lands range from about 5,000 to 6,100 feet in elevation and have a semiarid to arid climate with an average frost-free season of about 160 to 170 days. Annual precipitation averages less than 9 inches with about half occurring during the growing season, making irrigation necessary for successful crop production. With irrigation, climatic conditions are favorable for growing most field crops, a variety of garden crops, and such fruits as apples, pears, peaches, cherries, and apricots. Most of the project acreage would be utilized for production of livestock feeds with smaller acreages being utilized for fruit and garden crops. Principal livestock would be dairy cows and sheep.

Detailed land classification of virtually all the project area show the lands to be suitable for sustained production of crops under irrigation farming. Water supply studies show that the 137,250-acre project would require an average annual irrigation diversion of about 630,000 acre-feet. Simulated operation studies, based on streamflows as they have occurred in the past, indicate that an adequate water supply would be available with permissible shortages occurring in occasional drought years. The average annual stream depletion that would result from the development would be about 341,000 acre-feet.

This statement is based on the physical plan of development presented in the January 1955 feasibility report on the Navaho project compiled by the Bureau of Indian Affairs. Results of estimates for the project reflecting October 1954 construction prices are shown in the attached summary tabulation.

Navaho project, New Mexico, summary data

Irrigated acreage:

	Navaho Indian Reservation	Nonreservation	Total
New land, total	109,000	28,250	137,250
Gravity	90,240	2,800	93,040
Pump (hydraulic)	18,760	25,450	44,210

Principal agricultural production:

Alfalfa, grains, pastures, beans, some fruit and vegetables, dairy cows, sheep.

Water supply:	*Acre-feet*
Average annual increase in storage and direct flow diversions	630,000
Stream depletion (average annual)	341,000

Project works:

Construction features would include Navaho Dam and Reservoir on San Juan River, with approximately 1,450,000 acre-feet total capacity (778,000 acre-feet active), a 29-mile main highline canal to divert from reservoir about 270 feet above stream bed at dam, a drop from highline canal to a lower main gravity canal extending about 120 miles from the drop, a turbine-driven pump at the drop to lift water to about 32 percent of project lands, 2 main canals extending beyond the pump lift, distribution laterals, and drains. Reasonably efficient construction of the project would require about 15 years, except for drains.

Construction cost and repayment:		
Estimated construction cost		[1] $212,037,300
Reimbursable allocation to:		
Navaho project irrigation	$209,939,300	
San Juan-Chama project	800,000	
		210,739,300
Nonreimbursable allocation to:		
Flood control	1,106,000	
Recreation	192,000	
		1,298,000
Repayment by:		
Navaho project irrigation water users [2]	30,730,000	
San Juan-Chama project	800,000	
Power revenues from Colorado River storage project	179,209,300	
		210,739,300

Annual operation, maintenance, and replacement costs:	
Irrigation	370,600
Flood control	200
Recreation	65,000
Total	435,800

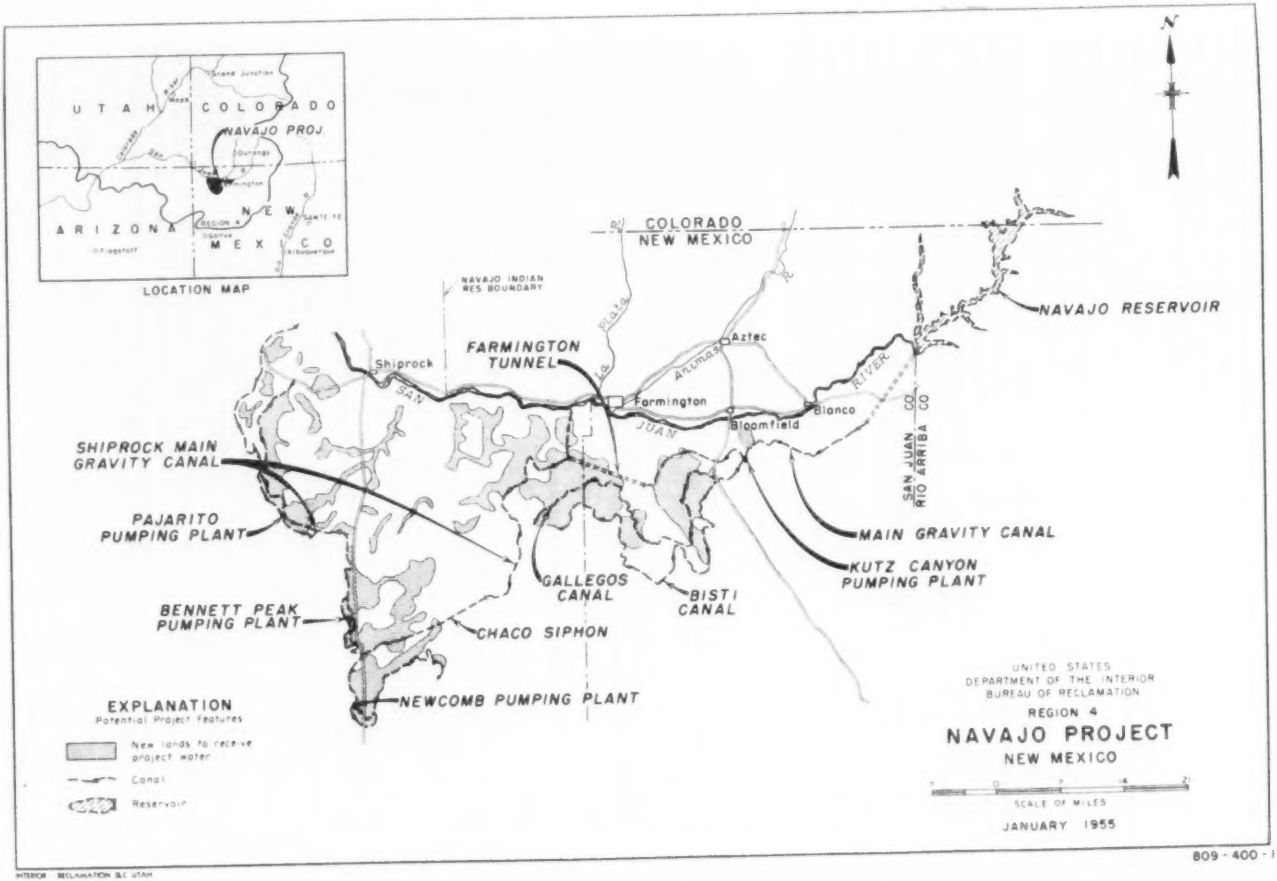
[1] Includes $192,000 for cost of recreation facilities.

[2] Based on assumption that all Indian-owned lands would repay at same rate as non-Indian-owned lands, and that repayment on Indian-owned lands would be deferred under provisions of act of July 1, 1932 (47 Stat. 564).

STATEMENT ON SAN JUAN-CHAMA PROJECT, COLORADO AND NEW MEXICO

The San Juan-Chama project would divert water from the headwaters of the San Juan River, a principal tributary of the Colorado River, into the Rio Grande Basin for the purposes of providing supplemental water for existing irrigation projects and for municipal and industrial uses. Although water for diversion would be collected from the tributaries of the San Juan located in both Colorado and New Mexico, all of the water would be used in New Mexico in the Rio Grande Basin. By exchange the project would also increase the use of water in New Mexico in the Canadian River Basin. The present plan provides for the diversion of 235,000 acre-feet of Colorado River Basin water annually out of the total amount allocated to New Mexico under the provisions of the upper Colorado River Basin compact.

With project development, an adequate supply of excellent quality water would be available to satisfy the rapidly growing municipal and industrial requirements of the Albuquerque metropolitan area, the population center of the Rio Grande Basin. Water would also be available to supplement the now deficient supply for some 225,000 acres of irrigated land in the area and to replace water depletions occurring throughout the basin from watershed improvement programs and groundwater pumping. In addition, the project would improve the conditions


LOCATION MAP
UTAH
COLORADO
NAVAJO PROJ
ARIZONA
NEW MEXICO
COLORADO
NEW MEXICO
NAVAJO INDIAN RES BOUNDARY
NAVAJO RESERVOIR
FARMINGTON TUNNEL
Shiprock
Aztec
Farmington
Bloomfield
Blanco
SAN JUAN
RIVER
SAN JUAN CO
RIO ARRIBA CO
SHIPROCK MAIN GRAVITY CANAL
PAJARITO PUMPING PLANT
MAIN GRAVITY CANAL
KUTZ CANYON PUMPING PLANT
GALLEGOS CANAL
BISTI CANAL
BENNETT PEAK PUMPING PLANT
CHACO SIPHON
NEWCOMB PUMPING PLANT
EXPLANATION
Potential Project Features
New lands to receive project water
Canal
Reservoir
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
REGION 4
NAVAJO PROJECT
NEW MEXICO
SCALE OF MILES
JANUARY 1955
809-400-1

for recreation, fish, and wildlife activities in the Rio Grande Basin, which is the center of one of the more important tourist and recreational areas in the country.

1. *Collection and diversion features.*—This system would comprise three reservoirs having a total capacity of 190,000 acre-feet located on the West Fork, East Fork, and Rio Blanco tributaries of the San Juan River and a feeder canal and conduit system to collect and transport the water to the head of Willow Creek in the Rio Grande Basin. The conduit system would be about 49 miles in length and would have a terminal capacity at the outlet of the tunnel through the Continental Divide of 1,000 cubic feet per second.

2. *Regulatory features.*—Heron No. 4 reservoir, having a 400,000 acre-foot capacity, located on Willow Creek, a tributary of the Rio Chama, would provide the storage required to regulate water releases for irrigation, municipal and industrial uses, and replacement of basin depletions. The outlet works of the existing El Vado Reservoir, downstream, woudl be enlarged to permit full transmissions of anticipated releases from Heron No. 4 reservoir.

3. *Water-use features.*—Construction features for irrigation purposes would comprise regulatory reservoirs, rehabilitation of distribution systems, and some relocation and extension of canals and laterals on existing irrigation projects on Rio Grande tributaries. Water for these projects would be made available by operation under exchange agreements. Supplemental irrigation water would also be furnished the Middle Rio Grande project and the Elephant Butte district of the Rio Grande project, utilizing existing distribution facilities. The present plan does not include construction features for delivery of municipal and industrial water beyond the regulating reservoir. Such features could be added later as part of the project if the local interests desire Federal construction and financing. No facilities are required to be constructed for delivery of the water to replace basin depletions. Construction of project features would be accomplished over a period of about 6 years.

This statement is based on the physical plan contained in a Bureau of Reclamation project report now in the process of completion. The financial data and analysis of the project were made in January 1955 and conform to current policy and procedure. The project investigations are of adequate degree of detail to use in project authorization, with the construction costs based on October 1954 prices. Preliminary studies of the potentialities of fish and wildlife development indicate it may ultimately be desirable to make an allocation of water to this purpose. Results of current estimates for the project are included in the attached summary tabulation.

Summary data, San Juan-Chama project, Colorado and New Mexico

Irrigated acreage:	*Acres*
New land	None
Supplemental land	225,000
Water supply: Allocation of diverted San Juan River water:	*Acre-feet*
Irrigation	179,200
Irrigated lands	136,700
Replacement of Rio Grande Basin depletions	42,500
Municipal and industrial water	55,800
Stream depletion (average annual diversion from San Juan River Basin)	235,000

Project works:

Principal construction features would include 3 reservoirs of 190,000-acre-foot total capacity in the headwaters of San Juan River, a 49-mile conduit system to collect and divert water from San Juan River Basin to Rio Grande Basin, a 400,000-acre-foot reservoir in Rio Grande Basin to regulate San Juan River diversions, some additional reservoirs, rehabilitation of distribution systems, and some relocation and extension of canals and laterals in existing systems on Rio Grande tributaries.

Summary data, San Juan-Chama project, Colorado and New Mexico—Continued

Construction cost and repayment:	
Estimated construction cost	[1] $135,169,000
Reimbursable allocation to:	
Irrigation:	
Irrigated lands	87,531,000
Replacement of Rio Grande Basin stream depletions	20,393,000
Municipal and industrial water	26,775,000
Total reimbursable allocations	134,699,000
Nonreimbursable allocation	470,000
Total allocation	135,169,000
Repayment by:	
Irrigation water users	21,290,000
Basin depletions (Rio Grande Basin)	6,600,000
Municipal and industrial water users	[2] 26,775,000
Power sources from Colorado River Storage project	80,034,000
Total	134,699,000
Annual operation, maintenance and replacement costs:	
Irrigation:	
Irrigated lands	234,100
Basin depletions (Rio Grande Basin)	41,400
Municipal and industrial water	54,300
Total	[3] 329,800
Benefit-cost ratio	1.84 to 1

[1] Includes $800,000 of cost of potential Navaho Dam and Reservoir on San Juan River $110,000 for stream gaging and river operating facilities, and $360,000 for recreational facilities.

[2] Interest during construction amounting to $728,000 and interest on investment amounting to $27,539,000 would also be paid.

[3] Excludes $33,500 operation and maintenance of stream-gaging program.

Senator O'MAHONEY. Do not skip anything which we ought to know.

Mr. LARSON. I assume you know pretty well what is in it.

Senator O'MAHONEY. Some people do not seem to think so. I want the Senator from California to know what is in your statement.

Senator KUCHEL. Mr. Chairman, I assume that the recommendation of the Senator from Utah that the matter be printed in large type would, he felt, facilitate my understanding of it. Actually I am ready to make a motion that we do away with this small type all the way through the hearing because I have a difficult time reading it anyway.

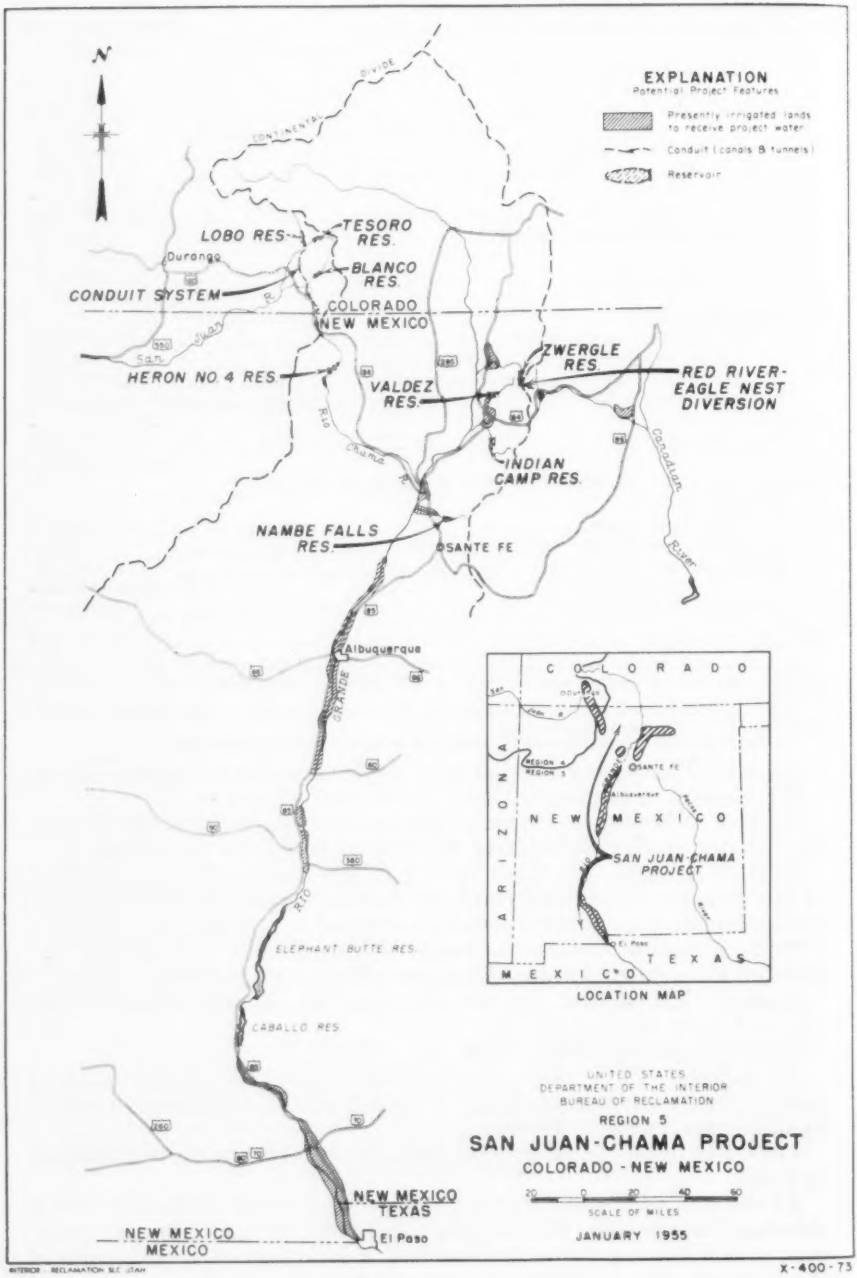
Senator O'MAHONEY. He was directing his remark to me because he sees I carry reading glasses.

You may proceed, Mr. Larson.

Mr. LARSON. In my statement I briefly covered the 11 participating projects and the 2 storage units recommended for initial authorization by the Secretary of the Interior.

Then I covered the additional projects and storage units contained in S. 500.

At the end of the statement I have a map of the Colorado Basin, showing the location of the storage units and the participating projects, and following the map is table 1, a summary of initial units of the Colorado River storage project and the 12 participating projects, the Eden project in Wyoming being the 12th project already authorized by previous legislation.


N
CONTINENTAL DIVIDE
EXPLANATION
Potential Project Features
Presently irrigated lands to receive project water
Conduit (canals & tunnels)
Reservoir
LOBO RES.
TESORO RES.
BLANCO RES.
Durango
CONDUIT SYSTEM
COLORADO
NEW MEXICO
San Juan R.
HERON NO. 4 RES.
VALDEZ RES.
ZWERGLE RES.
RED RIVER-EAGLE NEST DIVERSION
Chama R.
INDIAN CAMP RES.
Canadian River
NAMBE FALLS RES.
SANTE FE
Albuquerque
Rio Grande
ELEPHANT BUTTE RES.
CABALLO RES.
NEW MEXICO
TEXAS
NEW MEXICO
MEXICO
El Paso
LOCATION MAP
COLORADO
ARIZONA
NEW MEXICO
TEXAS
MEXICO
SAN JUAN-CHAMA PROJECT
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
REGION 5
SAN JUAN-CHAMA PROJECT
COLORADO - NEW MEXICO
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That gives a summary of information pertaining to the recommended projects.

Table 2 is a summary of information with the additional units added, namely, Cross Mountain, Curecanti, and Flaming Gorge, and the additional participating projects, Gooseberry, Navaho, and San Juan-Chama.

Following the tables there is a short 1- or 2-page statement of each of the participating projects and a small map showing the location of the land and the works.

For one of the projects, the Navaho, the statement was prepared by the Bureau of Indian Affairs, and another project, the San Juan-Chama, the statement was prepared by region 5 of the Bureau of Reclamation.

That is in general the information contained in my statement.

Senator O'MAHONEY. These charts are in such form that they can be reproduced in our hearings.

Mr. LARSON. Yes. The maps were all prepared on the basis that they readily can be reproduced for the hearings.

Senator O'MAHONEY. Very good.

Senator WATKINS. May I ask, Mr. Larson, have you any new matter in this statement that you did not give us a year ago when we held the hearings?

Mr. LARSON. I do not believe so, except that I have probably covered in a little more detail the water supply explanation.

Senator WATKINS. Is this largely a reproduction of what you gave us last year?

Mr. LARSON. Yes, it is essentially the same as last year, but changed to meet the present bill, S. 500, and as I stated, I have a more complete explanation of the water supply and have extended the explanations on costs, allocations and repayment, just to be more explicit as to what we meant before.

Senator WATKINS. Have you anything additional on the operation of the project and how it will work when completed?

Mr. LARSON. No. The operation of the plan has not been changed.

Senator O'MAHONEY. Have you made yourself familiar with the discussions which have been going on by members of the Upper Colorado River Basin Commission?

Mr. LARSON. Yes.

Senator O'MAHONEY. Are they covered in this statement?

Mr. LARSON. Do you have reference to the additional projects that were suggested by Governor Johnson of Colorado?

Senator O'MAHONEY. Yes; or any other project.

Mr. LARSON. Since those projects are not contained in S. 500, I did not include them in my statement. However, we do have information on those 20 projects.

Senator O'MAHONEY. When the Governor gives his testimony, you will be prepared to make any comment that the Bureau of Reclamation has reached with respect to such suggestions, will you?

Mr. LARSON. Yes, sir. We will be prepared to explain to you the reconnaissance work done on each of those projects and what the reconnaissance results show.

Senator O'MAHONEY. I think the question asked by Senator Watkins is one of great importance and ought to be made clear in everyday language so that those who do not understand how a flowing river

is administered by the Bureau and who fear that somehow or other the storage of water now being wasted would be disastrous or at least disadvantageous to those who through the magnificent action of Congress and its appropriations in the past have stored waters for the projects which they now enjoy.

Will you tell us how the Bureau balances the flow of the stream while it is building a reservoir so as not to destroy existing rights?

Mr. LARSON. Our studies show that the flow of the Colorado River varies greatly over the long period of years for which we have records. That means that we must build large holdover reservoirs that will carry water over from cycles of high runoff to dry cycles of drought years and smooth out, you might say, the river. With sufficient reservoir capacity the upper basin can be operated consistent with the 1922 Colorado River compact, and of course the 1948 upper Colorado River Basin compact.

Senator O'MAHONEY. Would I be stating it correctly by saying that the plan of administration of such a project as this would be to store floodwaters which in effect are not being used below and which would otherwise go to waste if they were not stored, and that this storage can be carried on without damage to those below?

Mr. LARSON. Yes, it can be accomplished within the terms of the compact without injuring rights below.

Senator O'MAHONEY. That is right. Of course, the compact binds us all. What was the purpose of those who drew the original compact in 1922, to provide that delivery of 7½ million acre-feet at Lee Ferry annually or 75 million in a 10-year period?

Mr. LARSON. Did you ask me a question?

Senator O'MAHONEY. Yes, sir.

Mr. LARSON. I do not think I have the question in mind. Will you please repeat it?

Senator O'MAHONEY. Yes. Do you know what the reason was of those who drafted the original compact to provide for the division at Lee Ferry of 7½ million acre-feet to the upper and lower basins—I am skipping the Mexican Treaty and the other provisions—and provide that the lower basin should deliver 7½ million acre-feet per year at Lee Ferry or 75 million acre-feet over a 10-year period? Was it not because of the great change in the flow of the stream?

Mr. LARSON. Yes, I assume the main purpose is to permit the development of the water resources of the Colorado River with an equitable share apportioned to each basin, so that the development could go forward. Both basins were anxious at that time to have things settled so development could go forward.

Senator O'MAHONEY. Was that not the only way by which there could be an adjustment of the great changes in the annual flow of the stream?

Mr. LARSON. By long-time regulation, yes.

Senator O'MAHONEY. Is there anything else you wish to tell the committee with respect to the Bureau of Reclamation's point of view? Some questions were asked of the Commissioner this morning, who referred the committee to you for answers. I assume you took note of them at the time; that is, having to do with some of the details.

Mr. LARSON. There is one point that we have tried to stress—the importance of the Glen Canyon Reservoir in the system. It provides

half of the storage of the main units in the upper basin. Inasmuch as it does, we tried to stress at least year's hearings, and we stress this time, that the holdover storage actually has to be long-time holdover storage and must be started in advance of when it is needed so that the reservoirs can be filled.

Senator BARRETT. May I ask a question, Mr. Chairman?

Senator O'MAHONEY. Surely.

Senator BARRETT. Mr. Larson, I note in your statement on page 9, you make the statement that the total consumptive use of water in the upper basin by all constructed projects, those authorized, and projects under construction, will be about 2½ million acre-feet.

Could you break those down and tell me offhand how much consumptive use is made by the constructed projects?

Mr. LARSON. It depends on which year you are talking about. Two or 3 years ago, or last year, we assumed that present uses were around 2 million acre-feet, and when all authorized projects are fully developed, it will be about 2½ million acre-feet. I do not know the latest figures on the transmountain diversion for Colorado-Big Thompson and other projects. We will have to bring that up to date for more accurate figures as to present cases.

Senator BARRETT. The total of the constructed projects and those under construction and the ones that are authorized now is 2½ million acre-feet?

Mr. LARSON. That is correct.

Senator BARRETT. How much do you estimate is the upper Colorado River depletion with the projects that are authorized in this bill?

Mr. LARSON. The stream depletion of the 11 participating projects and the Glen Canyon and Echo Park evaporation would bring the annual depletions up to 3½ million acre-feet, or an additional million acre-feet. The additional projects in the bill, the ones I read to you, would increase the total another 800,000 acre-feet. That is, the San Juan-Chama, Navaho, Gooseberry, Flaming Gorge, Curecanti, and Cross Mountain would bring the total up to 4,300,000 acre-feet.

Senator BARRETT. I would like to ask you, in 10 years time how much will the consumptive use be increased over and above the 2½ million we have at the present time, assuming that we have fairly orderly construction work going on?

Mr. LARSON. It would be a comparatively small amount because it would take at least 5 years to construct Echo Park and before the evaporation got too great. With the construction of Glen Canyon the period would be even longer than that. Then there is a long period of years for filling. The construction of anticipated initial projects is estimated at about 21 years, maybe more or less. These are the initial projects of our plan.

Senator BARRETT. In a period of 10 years, would you care to estimate how much of this additional consumptive use will be taken out of the stream there?

Mr. LARSON. What percent of the million acre-feet?

Senator BARRETT. Yes.

Mr. LARSON. Without making studies, I would not know. I would have to see which projects you are going to build first.

Senator BARRETT. Would it be less than half of it, would you say, in making a wild guess?

Mr. LARSON. For the first 10 years?

Senator BARRETT. Yes.

Mr. LARSON. There again it depends on whether you fill Glen Canyon within the 10-year period, stretch it out, and so on, and I don't believe I should pin that down. But it would certainly be much less than a million acre-feet.

Senator BARRETT. None of the 800,000 would be consumed in the 10-year period. That is, the other additional projects here. None of them will be under construction at all in 10 years.

Mr. LARSON. That again depends on the Congress appropriating money and their schedule of construction.

Senator BARRETT. First things are going to come first. We are going to work on the projects that are authorized under this bill, I assume, so it will be some time before you get on to other projects; is that right?

Mr. LARSON. Yes, I would assume that if all the other projects are added, the construction period will extend beyond 21 years.

Senator BARRETT. Would you be willing to say that in 10 years' time the consumptive use on the upper Colorado River project would not exceed 3,250,000 acre-feet, assuming that the project is authorized this year? That is adding 750,000 acre-feet annually to your 2½ million.

Mr. LARSON. Yes, that appears to be as good a guess as any.

Senator BARRETT. Assuming that is the case, would you think that my colleague from California, who is sitting on my right, has any reason to be concerned about the water that may be taken out of the river in the upper Colorado River States in that period of time?

Mr. LARSON. No; myself, I am not concerned. There is a feasible way of filling those reservoirs without interfering with the lower-basin rights under the compact.

Senator BARRETT. When we construct a reservoir that makes it doubly sure that his State, as well as the upper States are going to be that much better off; is that right?

Mr. LARSON. Yes; the lower basin States certainly will be better off with the construction of Glen Canyon.

Senator BARRETT. Thank you very much, Mr. Chairman.

Senator WATKINS. I would like to know, since you mentioned there is a way that could be done, how it can be done. How do you fill those reservoirs without interfering with anybody's rights?

Mr. LARSON. To begin with, we as engineers have assumed that the upper basin would have the right to store water, and would have the right to generate power. We realize that the Glen Canyon Reservoir has about half the capacity of the system of reservoirs that we have selected. So it sets the pace. If we can fill Glen Canyon, naturally we can fill the rest. It will take a long time.

Senator WATKINS. It will have a capacity of 26 million acre-feet.

Mr. LARSON. Yes, sir. We have proceeded on the basis that the upper basin would be completely fair in the delivery of water to which the lower basin is entitled under the compact, for the delivery of any water to Mexico which may have to come down from the upper basin and in the production of firm energy at Hoover Dam. Keeping those things in mind, Glen Canyon can be filled.

We have made a study and in years of high runoff when water runs on through the channel into the Gulf of California, there, of course, is

no question about filling Glen Canyon Reservoir. In average years it also could be done quite easily.

Senator WATKINS. What would you call an average year? What would be the flow of the river in an average year?

Mr. LARSON. I might say a series of average years when the historic flow was above 12 million acre-feet or some such figure. But the real test comes in the dry years. We have satisfied ourselves that under the most adverse streamflow conditions of record, upstream reservoirs can be filled and firm energy delivery maintained from Hoover through a combination of generation at Hoover and delivery of Glen Canyon energy to Hoover in lieu of releasing water through Hoover solely for power generation. In other words, in a year like we have right now, where water is short for firm energy at Hoover, we could not start storing at Glen Canyon. We must pick a year when Lake Mead has greater storage reserve, maybe over the 15 million acre-feet level. I am giving you one practical way in a dry cycle that will work. In that manner some water could be released from Lake Mead to keep up firm energy. With the interconnecting transmission line from Glen Canyon to Hoover, as soon as we get the dead-water space filled in Glen Canyon, and have at least half of the wheels installed before the gates are closed down, then Glen Canyon energy can be transmitted down to Hoover, thereby keeping the firm energy whole until Lake Mead reserve storage is built back. That is one practical way.

Senator WATKINS. What you would do in effect then is deliver power instead of water in the event of a shortage at Hoover of enough water for the energy needed.

Mr. LARSON. That is right. In some years you might take the whole 6 million acre-feet, which is about the dead-water capacity in Glen Canyon, or you could take it over 3 years, depending on the runoff years you have.

The other way is to wait for the years of high runoff when filling could be done fairly easily. So our study shows that there should be no insurmountable difficulties for the initial filling of the reservoir within a reasonable period of time. That is the conclusion we have reached as a result of our studies.

Senator WATKINS. That includes, of course, not only Glen Canyon, but Echo Park, and the rest.

Mr. LARSON. Yes. As soon as we get storage in Glen Canyon Reservoir, if the river should go down and we have to make deliveries to the lower basin, we can still do so from Glen Canyon and still store water in other reservoirs in the upper basin.

Senator WATKINS. Of course, Glen will make it possible through the catching of the silt to make Hoover itself much more valuable and have a bigger storage.

Mr. LARSON. That is correct. We have allowed for sediment detention in Glen Canyon for 200 years at the rate of somewhere near 100,000 acre-feet a year.

There is one other point I should have stressed in filling Glen. After we get up to the dead-water elevation of approximately 6 or 7 million acre-feet——

Senator WATKINS. What do you mean by "dead water"?

Mr. LARSON. It is the capacity which, after once filled is not drained, but used solely for power head and silt detention. The live storage is above that capacity.

Senator WATKINS. I was wondering when you said that you would take energy to make up at Hoover, whether you meant you would release water at Glen to make more power to send to Hoover, or whether you would take the normal flow of the stream which would go through Glen and develop the power sufficient there to make up for Hoover?

Mr. LARSON. In the drought years you could not afford to run any water from Glen solely for power into the Gulf of California. Naturally you would release what the lower basin was entitled to have, and simply transmit energy down there and some water, and let them store and build the reserve back in Lake Mead that was taken out during the filling of the 26 million acre-feet at Glen. That is just one way. There are different ways of filling Glen.

Senator WATKINS. I am certain that the committee would like to know some of the other ways.

Mr. LARSON. The other way is to wait for your high years. In other words, years of extremely high runoff.

Senator WATKINS. By doing that you would not interfere with the operation at Hoover Dam?

Mr. LARSON. No.

Senator WATKINS. You would simply be taking the water that otherwise would go into the gulf?

Mr. LARSON. Yes; we do not have many such years when water runs through Hoover without being used for power purposes, that is for firm and secondary energy purposes.

Senator WATKINS. For consumptive use there would be some that would be over and above what the lower basin could use consumptively.

Mr. LARSON. Yes. In working these studies we have based it on a delivery of 7½ million acre-feet to the lower basin through this drought period in case their uses were up to that.

Senator WATKINS. That would be each year delivery.

Mr. LARSON. That is right.

Senator WATKINS. In other words, you are not going to take advantage of the situation whereby you might short them for a time, but over a 10-year period deliver the full 75 million?

Mr. LARSON. Yes. Regardless of that provision, in our studies we have not shorted anybody in requirements up to that amount for irrigation and other uses.

Senator WATKINS. What I am getting at is that there would not be any time when you would short them under your program. They get full delivery every year.

Mr. LARSON. That is right.

Senator WATKINS. That is the program you are working out in connection with the filling of the reservoirs as they are built, and the delivery of water to lower interests.

Mr. LARSON. That is correct.

Senator WATKINS. So in effect they would not have any years in the future after this program got under way where they would only get 4 million, which was the amount of water delivered downstream a few years. I am talking about the shortage under the full amount for both divisions.

Mr. LARSON. The amount of releases from Glen Canyon would change from what the natural flow has been through the operation of a powerplant at the Glen Canyon Dam. The releases would be more uniform annually to generate power and meet the water requirements of the compact below.

Senator WATKINS. The point I want to be sure about is whether or not there would be under this arrangement sufficient water to meet the requirements on an annual basis for the lower users.

Mr. LARSON. Yes.

Senator KUCHEL. Mr. Chairman, first of all, does the Department's recommendations of projects coincide with the projects that are included in S. 500?

Mr. LARSON. The Secretary has recommended construction of 11 participating projects and 2 storage units, Glen Canyon and Echo Park, in his report of October of 1953. In addition to that you have other units and participating projects in the bill on which we are submitting information.

Senator KUCHEL. And those are Navaho.

Mr. LARSON. The Secretary has statements on Navaho, in his report of October, and some of the rest of them.

Senator KUCHEL. What are the others, Mr. Larson, which the bill includes, but which the Department does not recommend?

Mr. LARSON. Table 2 contains the additional projects in the bill not covered in the Secretary's initial recommendation.

Senator KUCHEL. This is in your large statement?

Mr. LARSON. Yes.

Senator KUCHEL. Subject to the approval of the chairman and the committee, I wonder if I might ask if you could be available in a week so that study could be made of your long report, and perhaps questions asked a little bit more intelligently.

Mr. LARSON. I am sure I will be here.

Senator KUCHEL. Mr. Larson, I want to thank you very much for sending me on Saturday a copy of your memorandum of February 24, 1955, addressed to you from the Assistant Commissioner and Chief Engineer. I would like to read a portion of it to the committee:

> In connection with the statement of the adequacy of the foundation rock at Glen Canyon Dam site, you are referred

says the memorandum—

> to my letter of July 1, 1954, to the Commissioner, subject: Colorado River storage project and possible alternative sites for Echo Park Reservoir, copy of which was sent to you at Salt Lake City. The third paragraph of this letter is quoted as follows:
>
> "The engineering and geologic problems incident to the construction of a dam at the Glen Canyon site have been discussed with Regional Director E. O. Larson, and he is familiar with the conditions at this site. The views of this office, which I am sure are shared by the regional office, are that the 26 million acre-feet capacity shown in the reports on the Colorado River storage project represents the maximum justifiable size of this reservoir on the basis of preliminary studies and testing. Following authorization of the project during the preconstruction phase, additional study and testing will be carried forward for the Glen Canyon site. It is anticipated that these tests will confirm our present opinion."

Then I would like to read a portion, Mr. Chairman, of a letter from the Secretary of the Interior under date of November 30, 1954, into the record, and I would like the permission of the Chair to put the entire letter in, which is only 2 pages.

Senator O'MAHONEY. Without objection it is so ordered.

Senator KUCHEL. Now, I quote a letter which Secretary McKay wrote to Mr. Brower, of California.

MY DEAR MR. BROWER: On October 21, 1954, you were informed that further reply would be made to your inquiries of September 28, 1954, addressed to the Secretary of the Interior and the Commissioner of Reclamation, concerning the effect of the proposed Glen Canyon Reservoir upon the Rainbow Ridge National Monument. We now have the necessary information from the field to complete that reply.

It is our intention to take whatever steps are necessary to protect the Rainbow Bridge National Monument from waters of the proposed Glen Canyon Reservoir and to ask Congress to provide for such protection in the authorizing legislation. Cooperative studies are underway by the field offices of the Bureau of Reclamation and the National Park Service to determine the best means of providing this protection, and to date these studies have revealed no unsurmountable problems. The topography of the area surrounding the monument indicates that a barrier dam 1 mile below the natural arch and outside the monument would provide adequate protection. Details of such a plan will require extensive study and are not available at this time.

On the basis of data available at the time of writing the 1950 report on Colorado River storage project and participating projects, a 700-foot dam (580 feet above stream level) at Glen Canyon was the maximum height which met the criteria of economy, safety of the structure, and adequate protection of the Rainbow Natural Bridge. Subsequent to writing the 1950 report on the Colorado River storage project, the Bureau conducted grouting tests in the drift tunnels driven 50 or 60 feet into each canyon wall of the Glen Canyon Dam site. Also, special bearing tests of 6-inch cores and large fragments of the foundation materials were made in the Bureau's Denver laboratory. The poorly cemented and relatively weak condition of the materials in comparison with the foundations common to most high dams has given the engineers who prepared the preliminary designs of the dam some concern as to the competency of the foundation to support any structure higher than 700 feet. Experiments to improve the strength of the foundation through a chemical grouting process were unsuccessful. These are the geological reasons why Commissioner W. A. Dexheimer made his statement in Denver about the limitation on the height of the proposed Glen Canyon Dam.

Following congressional authorization, more intensive studies will be made of the foundation conditions and of the Bureau's preliminary design to secure information for the preparation of plans and specifications for construction of the Glen Canyon Dam. If such intensive studies indicate the advisability of modifying the present selected height of dam, appropriate changes will be made in the designs prior to construction.

That to me is a very strange statement. It to me also however is a little bit troublesome. Would it be fair to say, Mr. Larson, that the technical engineering studies on the Glen Canyon Dam site so far indicates the possibility that Glen Canyon Dam might not be built there on the basis of engineering feasibility?

Mr. LARSON. No, sir; I do not think they infer that at all.

Senator KUCHEL. Tell me in your own words what the status is. Have you made some inquiry?

Mr. LARSON. The status is simply this. There have been more tests on Glen Canyon Dam site today than most dams that have been authorized in the past. Here the foundation is Navaho sandstone.

It is poor rock compared with granite and other dense rock, such as found at Hoover, so that our studies called for certain other elaborate tests. Six-inch cores were shipped to Denver and tested over a long period of time, to see what height of dam the rock would support. As a foundation gets less attractive, safety measures have to be taken to thicken the dam. You then get into economic design and ultimately, of course, you come to the safety of the structure as to how high you can go knowing certain conditions of the foundation and nature of the rock.

At the same time we have the large Rainbow Bridge to be concerned with upstream. A higher dam raises the water elevation on to the foot or pedestal of the natural bridge, so that taking into consideration the safety of the structure, the economics, and the protection of the Rainbow Natural Bridge, we arrived at 700 feet as the height that we would stop.

From all the studies we have up to now we feel that we can build a dam that high, but there is certainly a limit as to what you do, taking these three things into consideration. That was the height adopted, and we have nothing to cause us to change that height now, and I doubt it will be changed much later on.

Senator KUCHEL. Has the Bureau of Reclamation determined now that the present Glen Canyon Dam site is completely feasible from an engineering standpoint for construction?

Mr. LARSON. Yes, even though it does involve a large cost, it has a very great power potential and is a great storage reservoir. Taking those facts into consideration, to me it is a very feasible unit.

Senator KUCHEL. Would you say that the Secretary, when he said "following congressional authorization more intensive studies will be made of the foundation conditions and the Bureau's preliminary design" is now outdated since the time of this letter, and now you have completed your engineering studies?

Mr. LARSON. No. We would want to follow our usual practice. When a dam is authorized, we go in with much greater detailed tests to confirm what we have already found. That was true of Hoover, Hungry Horse, Shasta, and many other dams built in the past. Before we start construction we certainly want to verify our conclusions.

Senator KUCHEL. And if you were not sure and your subsequent inquiries demonstrated that you could not be sure, then you would not build Glen Canyon Dam at the present dam site?

Mr. LARSON. Yes. If they found something unexpected. But this rock is uniform both upstream and downstream from the site according to drill logs 400 feet below the bedrock under the river and 400 feet into the abutments, and examinations for miles upstream and each side, I cannot see that it can be upset very much, if any.

Senator KUCHEL. The only reason, again I speak as a layman, when I read a letter from the Secretary in which he speaks about experiments of the Bureau being unsuccessful, it raises in my mind some doubt as to just what the engineering feasibility of the project may be right now.

Mr. LARSON. You have to understand that in this way. Since the Navaho sandstone is what we call a somewhat porous rock, it would be advantageous if chemical grout could be used to close the pores. That might cheapen the construction cost of the dam. Certain factors of safety might be less, and we might save money by it.

Senator KUCHEL. So the fact that the experiments were unsuccessful really may be a boon?

Mr. LARSON. Then we do something else.

Senator WATKINS. The impression seems to have gone out from the Secretary's statement that there is grave doubt as to the safety of the height of the dam as proposed.

Mr. LARSON. I do not think there is any doubt as stated by the Chief Engineer in his letter just read by Senator Kuchel, which referred to stopping at a dam up to 700 feet high. That was the height he was willing to go on. I have been in conferences on this subject on several occasions.

Senator WATKINS. Then 700 feet is considered from the standpoint of the engineers to be safe?

Mr. LARSON. Yes. We can build a dam that high.

Senator WATKINS. In that particular formation.

Mr. LARSON. That is right.

Senator WATKINS. There is not any particular doubt or any specific doubt about the safety of a dam that high in that place?

Mr DEXHEIMER. May I amplify that a little bit?

Senator WATKINS. I wish you would because there has been some misunderstanding created. If it is not a safe place to build a dam, certainly we do not want to build it there.

Mr. DEXHEIMER. I have personally been in on the original exploration and the construction of Hoover Dam, Shasta Dam, and many others from days before they were conceived. I have investigated this site and gone through the geology. We have done a great deal more investigation on Glen Canyon than we have on Hoover or the others. We have no doubt at all but what a dam of 700 feet height at the Glen Canyon site is entirely practical, feasible, and economical, and would be safe from an engineering standpoint.

Senator WATKINS. Then how does this question arise about an additional height being unsafe?

Mr. DEXHEIMER. The question there related to a possibility that we might raise the height of Glen Canyon Dam as a substitute for some other project.

Senator WATKINS. To be specific, it has been suggested by some of the opponents of this project that Glen Canyon raised would be a substitute for Echo Park.

Mr. DEXHEIMER. The opposition has raised that question; yes.

Senator WATKINS. What you are saying now is that if you raise it beyond 700 feet in height you are taking a chance and it would be unsafe to build it to the extra height as a substitute for Echo Park.

Mr. DEXHEIMER. That is right. Under no circumstances should a higher Glen Canyon be considered as a substitute for Echo Park.

Senator WATKINS. If you are justified in your opinion, that would eliminate a high Glen Canyon as a substitute for Echo Park?

Mr. DEXHEIMER. That is correct, even though from an engineering standpoint it might be feasible to raise it a little higher, it still would not be a substitute for Echo Park, because of many other factors.

Senator WATKINS. Would you care to name those factors, because later on you are certainly going to be asked to name them.

Mr. DEXHEIMER. The question of the protection of the Rainbow Natural Bridge. Of course, the safety of the structure. If we went

higher, it might add to the cost of enlarging the foundation and so on, and the question of evaporation, because the water at a higher elevation than we plan for Glen Canyon would spread out over a wider territory, and evaporation would be much greater percentagewise over the water stored than the 26 million acre-foot limitation.

Senator WATKINS. Let us get back to the physical safety of a higher dam. It that an important element in what you have just said?

Mr. DEXHEIMER. It is very important.

Senator WATKINS. Then you would not recommend a higher dam than 700 feet even from the safety factor.

Mr. DEXHEIMER. The only reason we would go a little bit higher would be if our detailed investigations at a later time indicated that it was perfectly safe, was practical and economical to do so. But at the present time our studies indicate that 700 feet is the practical maximum at this time, because of all these other considerations.

Senator BARRETT. Mr. Dexheimer, I would like to ask you this question. Is the formation at Glen substantially the same as at Hoover and at Shasta?

Mr. DEXHEIMER. No, sir; they are entirely different rock formations.

Senator BARRETT. It is not sandstone at Hoover Dam?

Mr. DEXHEIMER. No, sir. Hoover Dam is what we call an andesite.

Senator BARRETT. Is Shasta sandstone?

Mr. DEXHEIMER. No, sir; it is granite.

Senator BARRETT. Do you have another dam site where you have used sandstone similar to this Navaho sandstone that is proposed to be used at Glen Canyon?

Mr. DEXHEIMER. There are a number of them around the world at different places, none quite the same as this particular formation, however.

Senator BARRETT. You never have heard of any difficulty arising because of the porosity of the sandstone being used as a base for the dam?

Mr. DEXHEIMER. No, sir. In fact, there are dams in other parts of the world where we have similar sandstone interlined with shale, which makes a much worse condition. We plan and think they can be feasibly built even to higher elevations than the 700 feet in this one.

Senator BARRETT. Now, Mr. Larson suggested that perhaps the porosity of the Navaho sandstone might be overcome by some filling of those little streaks through there. Has that ever been tried anywhere?

Mr. DEXHEIMER. We have experimented with cement grouting but it is just the porosity of the rock itself. When you get a certain amount of pressure on it, it might tend to give. There is a certain point where you might have a little difficulty. Chemical grouting has been tried in various formations and to some extent effective. It is particularly used in oil-well drilling. We would hope that when money is available for going ahead and this is authorized, to carry out further experiments to see if we could not solidify that foundation a little more by chemical grouting.

Senator BARRETT. Let me ask you this question. Assuming that you would take a slab of that standstone and exhibit it here on this table, would anybody be able to ascertain by looking at it that it was porous? I am talking about with the naked eye, and not a magnifying glass.

Mr. DEXHEIMER. Not that it would be porous as you might think of something with holes in it, but it is a question of relative porosity as compared with a much harder, denser rock. You could compare it in this way, that sandstone would appear to be something like a well-compressed brick as compared with a very dense hard rock.

Senator BARRETT. The reason I asked you that question is that I have seen cores come out of oil wells that looked just as solid as these colonnades here, and how in the world you could get oil to be produced from rocks of that type has always been intriguing to me, to say the least. I assume that is the same situation as far as this sandstone is concerned.

Mr. DEXHEIMER. Of course, the rocks they get oil from are generally a much more porous rock, and they have seams and cracks in them that let the oil through.

Senator BARRETT. If you look at one you will think it is just as solid as that marble over there. I will swear to that right now. You cannot ascertain it with the naked eye.

Mr. DEXHEIMER. I think that is true of many of our oil shales, too.

Senator KUCHEL. Mr. Dexheimer, I respect you as an engineer. I know nothing about it. When I receive a copy of a letter which the Secretary of the Interior has written, and he speaks of poorly cemented and relatively weak condition of the materials in Glen Canyon in comparison with the foundation common to most high dams has given the engineers who prepared the preliminary designs of the dam some concern as to the competency of the foundation to support any structure higher than 700 feet—so that I read his entire sentence—I do think we have a responsibility at least to inquire if it is not a fact that here at this time the conclusions which the Department has come to as to the site for Glen Canyon Dam, its feasibility, its safety, and all other factors, must at most be tentaive. Those are tentative conclusions?

Mr. DEXHEIMER. No, sir. They are firm conclusions for a structure up to 700 feet. There is no question in our minds.

Senator KUCHEL. Let me point out what else the Secretary of the Interior says:

> If such intensive studies—

and he is talking about the studies that would be made after congressional authorization—

> indicate the advisability of modifying the present selected height of the dam, appropriate changes will be made in the design prior to construction.

I shall not belabor this point, and certainly the engineering professionals in the Department are qualified to make that answer, I understand, but it did seem to me that the comments of the Secretary had some relevance to this hearing as they might indicate that the conclusions on a major project here, Glen Canyon, are tentative.

Mr. DEXHEIMER. No, sir; they are not. Up to 700 feet they are as firm as it is possible for us to get them with the much greater investigation than we have conducted on similar type structures. We are convinced that is entirely feasible and practical up to that height. As I mentioned before, however, we might change it a little bit depending on the future studies. It might even be a little bit higher provided all the other criteria of economy, protection of the bridge, and other factors would balance out in that important detailed design study.

Senator KUCHEL. The Secretary is correct, is he not, Mr. Dexheimer, that if authorization were provided by Congress, more intensive studies, to use the Secretary's words, would then be made of the foundation conditions and of your preliminary design?

Mr. DEXHEIMER. That is our standard practice. We always do that. However, we are much further ahead with those studies in the case of Glen Canyon than we have ever been on any dam before.

Senator KUCHEL. Now I would like to ask Mr. Larson just a few questions in addition. I think it might be of interest to the members of the committee. I have here an order of the United States Supreme Court entered this morning:

> The motion of California defendants for leave to file an amended answer is granted. The motion to join as parties the States of Colorado, New Mexico, Utah, and Wyoming is hereby referred to George I. Haight, special master, to hear the parties and report with all convenient speed his opinion and recommendation as to whether the motion should be granted. The Chief Justice took no part in the consideration or decision of these motions.

That was the order of the Supreme Court this morning. I read it because I do feel that the whole question involved in quantity of water under the Colorado River compact is relevant here. I think this committee ought to be able to obtain from competent witnesses connected with the Department of the Interior their understanding of what the compact would require the Department of the Interior to do under the provisions of S. 500. I do not want to take the time of the committee, or yours, Mr. Larson, to go over the questions which I endeavored to ask Mr. Dexheimer this morning, except to ask you if S. 500 became the law, and if Glen Canyon Dam were erected, there would be a responsibility, would there not, on the Department of the Interior to release such waters from Glen Canyon as would meet the compact requirements at Lee Ferry?

Mr. LARSON. That is correct. There is so much leeway between the water that is used now, the 2½ million acre-feet for authorized projects, and since several years would elapse before it gets very much more than that there is so much leeway between the 2½ and the 7½ million acre-feet apportioned to the upper basin States that surely engineeringwise there is a way of filling Glen Canyon reservoir without violating or being inconsistent with the terms of the Colorado River compact.

Senator KUCHEL. What would be your understanding of the amount of water that would have to be released from Glen Canyon Dam to Lee Ferry in order to meet the obligations imposed by the Colorado River compact.

Mr. LARSON. That depends on several things. It depends on the requirements within the rights below, the streamflow, and whether there is surplus water or not. Several factors enter into that so I could not give you any exact amount.

Senator KUCHEL. What would be your understanding of your responsibility as the representative of the Department of the Interior under the very terms of the Colorado River compact?

Mr. LARSON. Our responsibility, I think, would be this: We start out on the assumption that the upper basin has the right to store water and has the right to use the water for the generation of power. Next would be to operate the river consistent with the Colorado compact of 1922 and the upper basin compact of 1948, and also make any

deliveries of water to Mexico that may be required of the upper basin under the Mexican Treaty or the compact.

Senator KUCHEL. And again with respect to the Colorado River compact, what would your understanding be of the amount of water required to be delivered by the Department of the Interior to the lower basin States at Lee Ferry?

Mr. LARSON. That again would vary from year to year but in our studies we have satisfied ourselves that if they were using the entire 7½ million apportioned to them together with any surplus to which they are entitled, we could still fill Glen Canyon Reservoir inasmuch as the upper basin is using only a small portion of its total 7½ million acre-feet.

Senator KUCHEL. Did you agree with Governor Johnson's statement which I read this morning on the Colorado River compact?

Mr. LARSON. I would not attempt to pass any opinion on the interpretations of the Colorado River compact.

Senator KUCHEL. Do you feel that the Colorado River compact must inevitably be interpreted by whoever determines how much the Department of the Interior is going to be required to release from Glen Canyon Dam?

Mr. LARSON. I do not think you have to have it interpreted to go ahead with the development in the upper basin on account of all the leeway I have described to you. There is so much leeway in unused water in the upper basin under its apportionment that we should not have any trouble filling Glen over the years and——

Senator KUCHEL. Suppose you did?

Mr. LARSON. And particularly where water is going to waste into the Gulf of California as far as irrigation use is concerned.

Senator KUCHEL. In other words, what I am trying to get to is this: In your statement you suggest on page 6 of the Colorado River compact in article IIIa apportioned from the Colorado River system in perpetuity to the upper basin and the lower basin, respectively, exclusive of the consumptive use of 7½ million acre-feet per annum. There is a provision in article IIId of the same compact, the States of the upper basin, Colorado, New Mexico, Utah, and Wyoming, will not cause the flow of the river at Lee Ferry, the point of division between the upper and lower basins, to be depleted below an aggregate of 75 million acre-feet for any period of 10 consecutive years. These are controlling and most important limitations with respect to the water uses in the upper basin, although there are other provisions in the compact relating to uses and deliveries of water.

That was a part of your prepared statement.

Mr. LARSON. That is correct.

Senator KUCHEL. So it seems to me that it should be a clear responsibility of the Department of Interior to regulate the flow of water from Glen Canyon in accordance with the Colorado River compact. There would be no question about that.

Mr. LARSON. No, regulation has to be consistent with it, that is correct.

Senator KUCHEL. And the needs of the people in the lower basin States and in particular parts of the State from which I come are going to grow. Their only guideline as to how much water they have from the waters of the Colorado River are involved in the Colorado

River compact; is that not right? Certainly I want them to get not a drop more than they are entitled to under the Colorado River compact, and I do not want them to get a drop less than what is entitled to them under the Colorado River compact. I do think that some of the reasonable people from my State have raised these questions of just exactly the jurisdiction the Interior Department would have over the project, and that got me this morning into the questions with Mr. Dexheimer.

Somewhere along the line someone is going to have to advise the Department of the Interior how much, and when, water shall be released from Glen Canyon Dam to be delivered at Lee Ferry. That is certainly correct; is it not?

Mr. LARSON. Yes, I assume so. The Upper Basin Commission will make a finding of fact which we would operate within.

Senator KUCHEL. Sir?

Mr. LARSON. The upper basin compact provides for the findings of fact by the Upper Basin Commission, and I assume we would operate within those, and also operate consistent with the 1922 compact.

Senator KUCHEL. The upper basin compact?

Senator WATKINS. If I may be permitted a question there, the use of the upper basin compact findings of fact would be for the distribution of water to the upper basin States.

Mr. LARSON. That is right.

Senator WATKINS. They would not attempt to write any findings of fact or regulations for the lower basin, I understand.

Mr. LARSON. No sir; as I understand it.

Senator KUCHEL. I do want that whole question of quantity of water explored, and again, Mr. Larson, I would like to be able to defer until later on in this hearing for a couple of days questions on your complete report. I want also very briefly, however, at this time, to raise the question which likewise is of concern to the lower basin, or anyway part of the lower basin, and that is this question of quality of water.

Have studies been made now by the Department of the Interior relative to the problem of quality of water?

Mr. LARSON. Yes. Our technicians have gone over the quality of water samples taken by the Geological Survey at various points in the upper basin States. If you care to have me read from my statement the comments I have on the quality of the water——

Senator KUCHEL. Where is that?

Senator O'MAHONEY. Pages 9 and 10 of the introduction.

Senator WATKINS. Mr. Chairman, I suggest that be read, because that is one of the controverted points.

Senator O'MAHONEY. Will you proceed, please?

Mr. LARSON. Our studies show that the recommended units and projects would have no material effect on the quality of water downstream. With respect to later phases of development, the plan provides for additional gaging and sampling stations to supply data for continued analysis and scrutiny as each phase approaches authorization. Our analysis of the quality of water at Lee Ferry reveals for the critical period of low flow, 1931 to 1947, concentrations of dissolved salts averaging 0.78 ton per acre-foot (575 parts per million), corresponding to uses totaling 2½ million acre-feet per annum in the upper basin. An average concentration of 0.85 ton per acre-

foot (625 parts per million) or an increase of about 9 percent is anticipated at Lee Ferry following completion of the recommended Glen Canyon and Echo Park storage units and the 11 initial participating projects, with a corresponding use then totaling about 3⅓ million acre feet. With full use of the 7½ million acre-feet per annum allotment in the upper basin, the average concentration of dissolved salts at Lee Ferry is estimated at about 1.20 tons per acre-foot (880 parts per million).

Under any of the above conditions, concentrations and type of salts are well within the standard range for irrigation water designated by the United States Salinity Laboratory at Riverside, Calif., as "good to permissible," and within the range of practical treatment for municipal and industrial purposes.

Senator KUCHEL. What does that phrase "good to permissible" mean, Mr. Larson? How do you define it?

Mr. LARSON. I would like to refer that question, if I may, to Mr. Jacobson, our engineer for the Colorado River storage project, who is more familiar with it and can answer the question better. May I do that, Mr. Chairman?

Senator O'MAHONEY. Certainly.

Mr. JACOBSON. The United States Salinity Laboratory in California is recognized as probably the most expert and well-grounded source of information in this field.

Senator O'MAHONEY. In what State is that?

Mr. JACOBSON. It is operated by the United States Department of Agriculture in Riverside, Calif. They have calibrated irrigation water into four different categories, the first being "excellent to good."

Senator KUCHEL. You were not attempting to attack the credibility, were you, Senator?

Senator O'MAHONEY. Not at all. I was trying to strengthen it.

Mr. JACOBSON. The second category is "good to permissible." The third is "doubtful to unsuitable." The fourth is "unsuitable." These categories are merely a means of calibrating irrigation water based on a salinity expressed in parts per million and the percentage of sodium in the dissolved solids.

Senator KUCHEL. In that category, then, I suppose the different types of water are all fit for human consumption except No. 4. If it is not to be defined as unsuitable, the other waters are good waters.

Mr. JACOBSON. These categories, of course, are calibrations for irrigation purposes, and not necessarily for domestic uses. Colorado River water is well within the range of treatment for domestic purposes.

Senator KUCHEL. It is well within for domestic purposes?

Mr. JACOBSON. That is right.

Senator KUCHEL. And also for purposes of irrigation?

Mr. JACOBSON. That is correct.

Senator KUCHEL. Have those studies gone along and are going along today by the Department of Agriculture?

Mr. JACOBSON. Yes, the most recent report of their salinity laboratory was released last year, going even one step further, whereby they apply water of various types and salt concentrations to soils of various absorptive abilities.

Senator KUCHEL. Has any other agency of Government made such study on the question of quality of water? Has your own agency made any studies along those lines?

Mr. JACOBSON. We do in relation to application of the water to soils, yes. But the experimental work is largely done under the Department of Agriculture, and I think this is the focus or the center where such experiments are conducted.

Senator KUCHEL. Was there not established in the Boulder Canyon Adjustment Act a fund of approximately half a million dollars a year to be used in part for determining studies of both quantity and quality of water?

Mr. LARSON. Yes. There was established the fund of $500,000 annually, retroactive to 1938, and it has been used by the Bureau of Reclamation ever since, and is being used today. There is some money being spent for quality of water analysis but most is used for investigation throughout the upper Colorado River Basin for the irrigation projects. The quality of water programs on the main river and tributaries are being carried on at sampling stations maintained by the Geological Survey.

Senator KUCHEL. So that the studies that have been made so far on the question of quality of water have not been made by the Department of Interior. They have been made by the Department of Agriculture, as Mr. Jacobson suggests, and by the Geological Survey.

Mr. LARSON. The measurements of the salt content of the water are by the Geological Survey which maintains these stations for measuring the silt and the salt.

Senator KUCHEL. Are the results of the investigation of the Geological Survey available for this committee?

Mr. JACOBSON. Yes. I possibly should make an explanation. The Geological Survey is a unit of the Department of the Interior. It is largely a basic data-gathering agency. The studies conducted by the Bureau of Reclamation are an assembly of the basic data, and an analysis by which the basic data are put into proposed river operations studies for the forecast of future salinity. The Geological Survey data are available in their annual publications.

Senator KUCHEL. Could they be made available? Do they have a bearing on this question of quality of water? Is there anything in the Geological Survey's investigations that would aid people in endeavoring to determine the quality of water? If they would, we ought to have them.

Mr. LARSON. The statement that I read is based on the salt measurements or the salinity measurements made by the Geological Survey, and then rated under the Standards of the Riverside Laboratory of the Department of Agriculture.

Senator O'MAHONEY. Mr. Larson, and Mr. Jacobson, is it not a fact that the human body can use more salt water than a farm can for growing good crops?

Mr. LARSON. I think that is correct, Senator.

Senator O'MAHONEY. And if the human body cannot consume a lot of salt water, what would the people on the California beaches do?

Mr. LARSON. Dehydrate, I suppose, if they did not have any salt.

Senator KUCHEL. I have nothing further.

I have no further questions on this quality of water except to say it has not been developed here as I think it ought to be developed.

I would like again to have an opportunity to ask further questions of you on that point, Mr. Larson.

Just so I understood the comments on so-called dead water, does that constitute water that remains in the Glen Canyon Dam more or less permanently as a part of the capacity of the reservoir that stays there?

Mr. LARSON. Yes, sir.

Senator KUCHEL. Under your contemplation that would have no bearing on the amount of water that was released from Glen Canyon?

Mr. LARSON. Yes, it would have a bearing. It would have to be acquired without interfering with the deliveries of water in the compact. It would be out of the upper basin's share.

Senator KUCHEL. To that extent its presence in that dam would not affect the flow of water out of the dam to the lower basin?

Mr. LARSON. That is correct. I should correct the figure of 7 million acre-feet; Mr. Jacobson tells me it is closer to 6 million than 7 million, but, anyway, it is within that range.

Senator KUCHEL. That is all.

Senator O'MAHONEY. Mr. Larson, just a few questions.

On page 10 of your statement you fix the amount of water to be used in the 11 participating projects in S. 500 as 3½ million acre-feet. That is the maximum, is it?

Mr. LARSON. That would be the amount of water depletion above Lee Ferry for all existing projects including those authorized and the projects in the bill recommended by the Secretary.

Senator O'MAHONEY. Yes.

Mr. LARSON. There are some additional ones in the bill other than the Secretary's recommendation that would bring it up to 4,300,000.

Senator O'MAHONEY. But the projects, the participating projects which the Secretary and the Bureau have had an opportunity to investigate——

Mr. LARSON. Echo Park.

Senator O'MAHONEY. Echo Park, Glen Canyon, and 11 participating projects altogether would not use more than 3½ million feet.

Mr. LARSON. That is correct.

Senator O'MAHONEY. And if some other projects which were put in the bill last year, which I take it are in this year, in the upper Colorado River, were to be authorized, that would raise the use of water about 11 million acre-feet additionally.

Mr. LARSON. About 800,000 more. That is the San Juan-Chama diversion, the Navaho and Gooseberry projects, and the additional units, Curecanti, Cross Mountain, and Flaming Gorge reservoirs, that is, the evaporation from these three reservoirs.

Senator O'MAHONEY. That would be just a little over 4 million acre-feet.

Mr. LARSON. That is right.

Senator O'MAHONEY. Would that use in the upper basin be any danger to the use in California?

Mr. LARSON. No. taking into consideration the average goal, the long-time goal.

Senator O'MAHONEY. Would it be any danger to the use in California and the lower basin of the 7½ million acre-feet annually totaling 75 million acre-feet over any given 10-year period, which the upper basin is obliged to deliver to the lower basin?

Mr. LARSON. No. It would not interfere in a 10-year period. If you had Glen Canyon, Echo Park storage reservoirs, you are O. K.

Senator O'MAHONEY. That is why you have Glen Canyon, that is why you have Echo Park, in order to provide storage for waste water so as to protect California while the upper basin gets the use to which California agreed when it signed the compact; is not that the fact?

Mr. LARSON. That is correct.

Senator O'MAHONEY. How long have you been with the Bureau?

Mr. LARSON. I have been with the Bureau since June 15, 1923, about 32 years.

Senator O'MAHONEY. Were you an engineer when you began?

Mr. LARSON. Yes; I have been an engineer for 37 years.

Senator O'MAHONEY. Have you ever built a dam that collapsed yet?

Mr. LARSON. No, sir; and I hope I never do.

Senator O'MAHONEY. You would not want to, would you?

Mr. LARSON. No, sir.

Senator O'MAHONEY. Mr. Dexheimer, how long have you been an engineer?

Mr. DEXHEIMER. Twenty-six years with the Bureau of Reclamation and about 30 years altogether.

Senator O'MAHONEY. You mean that 30 added to 26?

Mr. DEXHEIMER. No, sir; not altogether.

Senator O'MAHONEY. Well, I saw that baldness. So that 30 years you have been an engineer and you have worked on a number of dams?

Mr. DEXHEIMER. Yes, sir.

Senator O'MAHONEY. Have you ever built a dam that collapsed, or worked on one for the Bureau that collapsed?

Mr. DEXHEIMER. No, sir.

Senator O'MAHONEY. You personally gave your study to this project?

Mr. DEXHEIMER. Yes, sir.

Senator O'MAHONEY. Mr. Larson, did you?

Mr. LARSON. Yes, sir. I have been on the Colorado River with a force of engineers for 10 years.

Senator O'MAHONEY. Would you consciously recommend to the Congress the building of a system that would be dangerous to the lower basin?

Mr. LARSON. No, sir.

Senator O'MAHONEY. Have both of you gentlemen given time to examination of these plans?

Mr. DEXHEIMER. Yes, sir.

Senator O'MAHONEY. How much time have you given, Mr. Dexheimer?

Mr. DEXHEIMER. Off and on for a period of 5 or 6 years.

Senator O'MAHONEY. Mr. Larson, what about you?

Mr. LARSON. Almost every day for 10 years.

Senator O'MAHONEY. Have you any doubts, either of you, in your minds, about the recommendation which has been made by the Secretary and by the President of the United States to the Congress with respect to this upper Colorado storage project?

Mr. DEXHEIMER. None whatever.

Mr. LARSON. No, sir.

Senator O'MAHONEY. Are there any other questions?

Senator WATKINS. Mr. Larson, I think you mentioned several times there were 11 participating projects. Do you not mean 12?

Mr. LARSON. Twelve, with Eden. Eden is already authorized. It need not be recommended for authorization again. Eden is included because it participates in the storage project revenues.

Senator WATKINS. I do not think Eden is in the list. I am talking about the projects in the bill S. 500. Central Utah, initial phase: Emery County, Florida, Gooseberry, Hammond, LaBarge, Lyman, Paonia, Pine River extension, Seedskadee, Silt, Smith Fork.

As we add them up here they come to 12, the engineer coaching me here has miscounted.

Senator O'MAHONEY. As the witness has said, Eden was authorized by bill reported out of the Interior Committee several years ago. It does not have to be included in this bill.

But the question is suggested, the use of water in the Eden project, is that computed in your figure of approximately 4 billion acre-feet?

Mr. LARSON. Yes.

But, Mr. Chairman, may I make this explanation: the 11 projects I refer to are the 11 recommended by the Secretary that are in the bill. In addition, there is Eden.

Senator WATKINS. We do not find it in the list I just read. As we count them here, as I say if my engineer assistant here has not miscounted——

Mr. LARSON. I think I can clear it up now. In the Secretary's supplemental report he recommended Echo Park and Glen Canyon units, the 11 participating projects, and then mentioned the Eden project as participating in revenues. We have to put it in our table. It is already authorized to participate.

Then in table 2 of my statement I have included the additional projects in the bill.

Senator WATKINS. The ones we have in the bill itself come to 12. The ones I just read.

Mr. LARSON. Well, I have them in the tables, but there were not 12 in the Secretary's recommendation.

Senator WATKINS. Well, I am talking about the bill.

Mr. LARSON. It is in here.

Senator O'MAHONEY. Eden is not left out. Nobody need worry about that.

Senator WATKINS. Apparently you left out Gooseberry, because that had not been sent to the States yet.

Mr. LARSON. Yes; it had not cleared the Bureau of the Budget and the affected States, and therefore was not included in the Secretary's recommendation.

Senator WATKINS. He could not do that. That is why his package is 11 projects. The package we have here is 12.

Mr. LARSON. That is correct.

Senator O'MAHONEY. Are these all feasible projects, these 11?

Mr. LARSON. Yes; they all have a favorable benefit-cost ratio. One or two of them are very close.

We hope that the benefit-cost ratio will improve with detailed investigation.

Senator O'MAHONEY. Well, we are very grateful to you, Mr. Larson, for your presentation and for your responses to our questions.

Senator KUCHEL. May I ask 1 or 2 more questions, Mr. Chairman?

Senator O'MAHONEY. Yes, indeed.

Senator KUCHEL. I think this is self-evident, but I would like the record to show it.

None of the water which would be stored in the Glen Canyon Dam would ever be used for either agriculture, domestic, or other purposes in the upper basin; is that correct, Mr. Larson?

Mr. LARSON. No; it would be used for all the purposes by exchange.

Senator KUCHEL. What I mean is none of the water that would be stored in Glen Canyon Dam would ever be used for any domestic or irrigation purposes in the upper basin; is that correct?

Mr. LARSON. Yes, generally; but I can't answer you that direct. There may be a town right on the bank by the Glen Canyon Reservoir that would pump the water out of the reservoir the same as Boulder City does out of Lake Mead.

Senator KUCHEL. It is hardly necessary to make the 26 million acre-feet.

Mr. LARSON. It would be very minor.

Senator KUCHEL. So that aside from any such minor contingency you would agree with me that the water stored in Glen Canyon would not be used for purposes in the upper basin?

Mr. LARSON. Physically, that is correct.

Senator WATKINS. You are referring to the actual physical water stored in that dam, I believe, Senator?

Senator KUCHEL. Yes, sir.

Thank you, sir.

Senator O'MAHONEY. You are excused, Mr. Larson.

Senator WATKINS. May I make this remark, Mr. Chairman?

Senator O'MAHONEY. Yes.

Senator WATKINS. I think Mr. Larson is disappointed that I have not asked him the series of questions that I did before, but I am relying on the record that went on before so I am going easy on you today.

Mr. LARSON. Thank you.

Senator O'MAHONEY. Mr. Keesee, of Gallup, N. Mex.

I should say to you, Mr. Keesee, that Senator Anderson is obliged to attend the meeting of the Atomic Energy Committee of which he is chairman, a Joint Committee. So he is unable to be present today.

Will you state your name for the record and identify yourself and then proceed with your statement.

Mr. KEESEE. I am J. B. Keesee, irrigation engineer on the Navaho Reservation for the Bureau of Indian Affairs.

The statement which I will read is contained in Mr. Larson's report, the large report which he just referred to.

This was prepared by our office and included in his report as among the participating projects.

STATEMENT OF J. B. KEESEE, INVESTIGATION ENGINEER ON THE NAVAHO RESERVATION FOR THE BUREAU OF INDIAN AFFAIRS

The potential Navaho project, formerly called the Shiprock and South San Juan projects, would provide for the irrigation of about 137,250 acres of arable dry lands lying along the south side of San Juan River, a principal tributary of Colorado River, near the towns of Bloomfield, Farmington, and Shiprock in northwestern New Mex-

ico. Of the lands that would be irrigated 109,000 acres are located in the Navaho Indian Reservation, and 28,250 acres are outside the reservation. All the lands within the reservation and 1,660 acres outside the reservation are Indian-owned. Remaining lands outside the reservation are publicly owned or privately owned by non-Indians.

The general plan of the project includes the Navaho Dam and Reservoir on San Juan River of 1,450,000 acre-feet total capacity 778,000 acre-feet active, and a main highline canal to divert from the reservoir at a point near the dam and at an elevation about 270 feet above the stream bed. This main highline canal of 2,630 second-feet capacity would divert the water to a point about 29 miles downstream from Navaho Dam where the water would be dropped through a direct-connected turbine pumping plant to a lower main canal that would extend westerly about 120 miles to serve the major portion of the project lands inside and outside of the reservation that are too high to be served by the gravity diversion. A distribution system would extend beyond the pump lift to deliver the pumped water to the highlands. A system of drains would be provided as required to prevent seepage of project lands. The Navaho Reservoir would be used jointly by the Navaho and San Juan-Chama project. The latter project is a potential transmountain diversion to the Rio Grande Basin from the headwaters of the San Juan River.

Planning investigations of the Navaho project have been made jointly by the Bureau of Indian Affairs and region 4 of the Bureau of Reclamation. The project is an integral part of the Indian Affairs' program to bring relief to the Navaho Indians from their very low family incomes and to make them self-sustaining.

Navaho project lands range from about 5,000 to 6,100 feet in elevation, and have a semiarid to arid climate with an average frost-free season of about 160 to 170 days. Annual precipitation averages less than 9 inches with about half occurring during the growing season, making irrigation necessary for successful crop production. With irrigation, climatic conditions are favorable for growing most field crops, a variety of garden crops, and such fruits as apples, pears, peaches, cherries, and apricots. Most of the project acreage would be utilized for production of livestock feeds with smaller acreages being utilized for fruit and garden crops. Principal livestock would be dairy cows and sheep.

Detailed land classification of virtually all the project area show the lands to be suitable for sustained production of crops under irrigation farming. Water supply studies show that the 137,250-acre project would require an average annual irragation diversion of about 630,000 acre-feet. Simulated operation studies, based on streamflows as they have occurred in the past, indicate that an adequate water supply would be available with permissible shortages occurring in occasional drought years. The average annual stream depletion that would result from the development would be about 341,000 acre-feet.

This statement is based on the physical plan of development presented in the January 1955 feasibility report on the Navaho project compiled by the Bureau of Indian Affairs. Results of estimates for the project reflecting October 1954 construction prices are shown in the attached summary tabulation.

Do you want this table read?

Senator O'MAHONEY. The table may be placed in the record as part of your remarks.

(The table referred to is as follows:)

Navaho project, New Mexico, summary data

Irrigated acreage:

	Navaho Indian Reservation	Nonreservation	Total
New land, total	109,000	28,250	137,250
Gravity	90,240	2,800	93,040
Pump (hydraulic)	18,760	25,450	44,210

Principal agricultural production:

Alfalfa, grains, pastures, beans, some fruit and vegetables, dairy cows, sheep.

Water supply:	*Acre-feet*
Average annual increase in storage and direct-flow diversions	630,000
Stream depletion (average annual)	341,000

Project works:

Construction features would include Navaho Dam and Reservoir on San Juan River, with approximately 1,450,000 acre-feet total capacity (778,000 acre-feet active), a 29-mile main highline canal to divert from reservoir about 270 feet above streambed at dam, a drop from highline canal to a lower main gravity canal extending about 120 miles from the drop, a turbine-driven pump at the drop to lift water to about 32 percent of project lands, 2 main canals extending beyond the pump lift, distribution laterals, and drains. Reasonably efficient construction of the project would require about 15 years, except for drains.

Construction cost and repayment:	
Estimated construction cost	[1] $212,037,300
Reimbursable allocation to:	
Navaho projection irrigation	209,939,300
San Juan-Chama project	800,000
Total	210,739,300
Nonreimbursable allocation to:	
Flood control	1,106,000
Recreation	192,000
Total	1,298,000
Repayment by:	
Navaho project irrigation water users [2]	30,730,000
San Juan-Chama project	800,000
Power revenues from Colorado River storage project	179,209,300
Total	210,739,300
Annual operation, maintenance, and replacement costs:	
Irrigation	370,600
Flood control	200
Recreation	65,000
Total	435,800

[1] Includes $192,000 for cost of recreation facilities.

[2] Based on assumption that all Indian-owned lands would repay at same rate as non-Indian-owned lands, and that repayment on Indian-owned lands would be deferred under provisions of act of July 1, 1932 (47 Stat. 564).

That concludes my statement.

Senator O'MAHONEY. Are there any questions?

Thank you very much, Mr. Keesee. We are obliged to you for your statement.

STATEMENT OF JOHN L. MUTZ, BUREAU OF RECLAMATION, DEPARTMENT OF THE INTERIOR

Mr. MUTZ. My name is John L. Mutz. I have been actively engaged for the last 10 years in planning for the development of water resources for the State of New Mexico.

The San Juan-Chama project has been under investigation for some 20 to 25 years. It has only been in the last few years that we have been able to complete plans for the use of water by this project inasmuch as the upper Colorado Basin compact had not been consummated until 1948.

We discussed this project to some extent last year. At that time we had no report available. As of now we do have a report completed. It has not been transmitted to the affected States or other agencies in conformance with the 1944 Flood Control Act.

Senator O'MAHONEY. When will it be transmitted?

Mr. MUTZ. The report is completed, sir. The report has not been transmitted to the affected States.

Senator O'MAHONEY. It has not been finished yet.

Mr. MUTZ. It has been finished as far as the report itself is concerned.

Senator O'MAHONEY. But it has not been transmitted to the States.

Mr. MUTZ. But it has not been transmitted to the States.

Senator O'MAHONEY. When will it be transmitted?

Mr. MUTZ. Within 30 days, as Mr. Bennett explained this morning, it should be transmitted to the States.

The San Juan-Chama project would divert water from the headwaters of the San Juan River, a principal tributary of the Colorado River, into the Rio Grande Basin for the purposes of providing supplemental water for existing irrigation projects and for municipal and industrial uses. Although water for diversion would be collected from the tributaries of the San Juan located in both Colorado and New Mexico, all of the water would be used in New Mexico in the Rio Grande Basin. By exchange the project would also increase the use of water in New Mexico in the Canadian River Basin.

Now I should explain here that the diversion into the Canadian would be carried out from some tributaries of the Rio Gande. These tributaries are in the upper reaches of the basin. The waters would be diverted through a small transmountain diversion into the Canadian. The present plan provides for the diversion of 235,000 acre-feet of Colorado River Basin water annually out of the total amount allocated to New Mexico under the provisions of the upper Colorado River Basin compact.

With project development an adequate supply of excellent quality water would be available to satisfy the rapidly growing municipal and industrial requirements of the Albuquerque metropolitan area, the population center of the Rio Grande Basin. Water would also be available to supplement the now deficient supply for some 225,000

acres of irrigated land in the area and to replace water depletions occurring throughout the basin from watershed-improvement programs and ground-water pumping. In addition, the project would improve the conditions for recreation, fish, and wildlife activities in the Rio Grande Basin, which is the center of one of the more important tourist and recreational areas in the country.

1. Collection and diversion features: This system would comprise three reservoirs having a total capacity of 190,000 acre-feet located on the west fork, east fork, and Rio Blanco tributaries of the San Juan River, and a feeder canal and conduit system to collect and transport the water to the head of Willow Creek in the Rio Grande Basin. The conduit system would be about 49 miles in length and would have a terminal capacity at the outlet of the tunnel through the Continental Divide of 1,000 cubic feet per second.

2. Regulatory features: Heron No. 4 reservoir, having a 400,000 acre-foot capacity, located on Willow Creek, a tributary of the Rio Chama, would provide the storage required to regulate water releases for irrigation, municipal, and industrial uses, and replacement of basin depletions. The outlet works of the existing El Vado Reservoir, downstream, would be enlarged to permit full transmissions of anticipated releases from Heron No. 4 reservoir.

3. Water-use features: Construction features for irrigation purposes would comprise regulatory reservoirs, rehabilitation of distribution systems, and some relocation and extension of canals and laterals on existing irrigation projects on Rio Grande tributaries. Water for these projects would be made available by operation under exchange agreements. Supplemental irrigation water would also be furnished the middle Rio Grande project and the Elephant Butte district of the Rio Grande project, utilizing existing distribution facilities. The present plan does not include construction features for delivery of municipal and industrial water beyond the regulating reservoir. Such features could be added later as part of the project if the local interests desire Federal construction and financing. No facilities are required to be constructed for delivery of the water to replace basin depletions. Construction of project features would be accomplished over a period of about 6 years.

This statement is based on the physical plan contained in a Bureau of Reclamation project report now in the process of completion. The financial data and analysis of the project were made in January 1955, and conform to current policy and procedure.

The project investigations are of adequate degree of detail to use in project authorization, with the construction costs based on October 1954 prices.

Preliminary studies of the potentialities of fish and wildlife development indicate it may ultimately be desirable to make an allocation of water to this purpose. Results of current estimates for the project are included in the attached summary tabulation.

Summary data, San Juan-Chama project, Colorado and New Mexico

Irrigated acreage:		*Acres*
New land		None
Supplemental land		225,000
Water supply allocation of diverted San Juan River water:		*Acre-feet*
Irrigation		179,200
Irrigated lands	136,700	
Replacement of Rio Grande Basin depletions	42,500	
Municipal and industrial water		55,800
Stream depletion (average annual diversion from San Juan River Basin)		235,000
Project works:		
Principal construction features would include three reservoirs of 190,000-acre-foot total capacity in the headquarters of San Juan River, a 49-mile conduit system to collect and divert water from San Juan River Basin to Rio Grande Basin, a 400,000-acre-foot reservoir in Rio Grande Basin to regulate San Juan River diversion, some additional reservoirs, rehabilitation of distribution systems, and some relocation and extension of canals and laterals in existing systems on Rio Grande tributaries.		
Construction cost and repayments:		
Estimated construction cost		[1] $135,169,000
Reimbursable allocation to—		
Irrigation:		
Irrigated lands		87,531,000
Replacement of Rio Grande Basin stream depletions		20,393,000
Municipal and industrial water		26,775,000
Total reimbursable allocations		134,699,000
Nonreimbursable allocation		470,000
Total allocation		135,169,000
Repayment by—		
Irrigation water users		21,290,000
Basin depletions (Rio Grande Basin)		6,600,000
Municipal and industrial water users		[2] 26,775,000
Power revenues from Colorado River storage project		80,034,000
Total		134,699,000
Annual operation, maintenance, and replacement costs:		
Irrigation:		
Irrigated lands		234,100
Basin depletions (Rio Grande Basin)		41,400
Municipal and industrial water		54,300
Total		[3] 329,800
Benefit-cost ratio		1.84 to 1

[1] Includes $800,000 of cost of potential Navaho Dam and Reservoir on San Juan River, $110,000 for stream gaging and river operating facilities, and $360,000 for recreational facilities.
[2] Interest during construction amounting to $728,000 and interest on investment amounting to $27,539,000 would also be paid.
[3] Excludes $33,500 operation and maintenance of stream-gaging program.

This particular report is based on the agreement that was reached last year in connection with Senate bill 1555. The testimony that I gave last year was based on another plan which called for power development on the Chama.

Subsequently Senate bill 1555 limited the plan to provide only sufficient regulations on the Chama to regulate the imported water.

The report and plan is based on that.

Senator O'MAHONEY. Are there any questions?

Senator WATKINS. I have no questions.

Senator KUCHEL. No questions.

Senator O'MAHONEY. Congressman Fernandez and Congressman Dempsey were on the list given to me. They do not appear to have come this afternoon. They are not in the room; are they?

Mr. Littell, you are next on the list.

STATEMENT OF NORMAN M. LITTELL, GENERAL COUNSEL, NAVAHO TRIBE OF INDIANS

Mr. LITTELL. Norman M. Littell, general counsel for the Navaho Tribe of Indians.

Mr. Chairman, and Senators, I was asked to apologize on behalf of the Navaho delegation because they are in the throes of what is equivalent to a national election on the Navaho Reservation.

Now, attending this hearing, they asked me to appear for them as late as this weekend; therefore, I have no prepared statement.

I would like to introduce in the record a resolution of the Navaho council pertaining to this subject without taking the time of the committee to read it.

Senator O'MAHONEY. It will be received.

Mr. LITTELL. Thank you, sir.

RESOLUTION OF THE NAVAHO TRIBAL COUNCIL ON COLORADO RIVER STORAGE PROJECT AND PARTICIPATING PROJECTS

Whereas:

1. Legislation has been introduced in the 84th Congress of the United States to authorize the Secretary of the Interior to construct, operate and maintain the Colorado River storage project and participating projects, and such legislation includes the Navaho project for the irrigation of lands of the Navaho people in New Mexico.

2. The United States, in establishing the Navaho Reservation in its treaty with the Navaho Tribe in 1868, offered in said treaty to grant 160 acres of agricultural land for every head of a family and 80 acres for single Navahos to establish Navaho families on farm lands, notwithstanding that there were not then, and have never been at any time since 1868 sufficient cultivatable lands to comply in a measurable degree with said treaty.

3. Because of the adverse conditions and the absence of water which prevents the raising of cultivated crops and settlement on farm lands, the Government encouraged the Navaho people to build up large flocks and rely almost wholly upon the raising of sheep and livestock by grazing on the open range, and such grazing, together with successive droughts, greatly reduced the natural forage, thereby adversely affecting the production of livestock and depressing the condition of our people to a degree which led to national concern and caused Congress to pass the Navaho-Hopi Rehabilitation Act of 1950.

4. In limited agricultural areas in the Navaho Reservation along the San Juan River, such Navaho families as could cultivate lands have proved that Navahos are successful farmers and that if irrigation water is supplied to the lands in the Navaho project as proposed in the foregoing legislation, one-fifth of our Navaho population could be settled on self-sustaining irrigated farm areas where their earnings would be comparable to those of our white neighbors on irrigated lands.

Now, therefore, be it resolved that:

1. The Navaho Tribal Council, on behalf of the Navaho Tribe, hereby respectfully petitions the Congress of the United States to adopt the proposed legislation authorizing the construction of the Colorado River project and participating projects including the Navaho project, thereby implementing and aiding in a vital and effective manner the established policy of Congress set forth in the Navaho-Hopi Rehabilitation Act of 1950.

2. The Council, on behalf of the Navaho people, respectfully suggests to Congress that the passage of said act is the only possible method of fulfilling to a large extent at this late date the aforesaid commitment in the treaty of 1868 (which is still the law of the land) by making available a substantial amount of farm lands on the Navaho Reservation.

CERTIFICATION

I hereby certify that the foregoing resolution was duly considered by the Navaho Tribal Council at a duly called meeting held at Window Rock, Ariz., at which a quorum was present, and that same was approved by a vote of 69 in favor, and 1 opposed on this 14th day of January 1955.

SAM AHKEAH,
Chairman, Navaho Tribal Council.

Approved:

ROBERT W. YOUNG,
Acting General Superintendent.

Mr. LITTELL. And I would like to submit the statement of the chairman, Sam Ahkeah, summarizing the importance of this project to the Navaho Tribe with the request that that statement be included in the record. It is very short and very interesting and quite vital.

Senator O'MAHONEY. Without objection, it will be received.

STATEMENT OF SAM AHKEAH, CHAIRMAN, NAVAHO TRIBAL COUNCIL

Mr. Chairman and members of the committee, my name is Sam Ahkeah, and I am chairman of the Navaho Tribal Council. I'm here to explain to you briefly what the San Juan-Shiprock project means to us Navaho people.

There are now about 79,500 of us. Our average cash income is $150 a year per person. The national average is over $1,500. Our income isn't low because we are lazy; it's low because we don't have the resources to make it any higher, like good farmland or big industries.

Most of our people make their living from raising sheep and growing their corn by dry farming in little patches. It takes about 22 acres of our land to support 1 sheep for a year.

The Federal regulations forbid any Navaho family from keeping more than 350 sheep, but very few families actually own that many.

There is less than a third of an acre of dry farmland per person on the reservation. We use every little draw on the reservation where the soil is good enough and there is enough natural moisture to grow corn or squash. We aren't lazy; we have to work hard to make a living at all on the kind of land we have.

That is the Navaho problem you have heard a lot about—poor land and not enough education.

Now this year for the first time most of our Navaho children are in school. There are about 28,000 Navaho children of school age, and 22,960 are enrolled in school. So that half of the Navaho problem is being solved at least.

The big problem remaining is how we and our children are going to make a living.

This Navaho project will irrigate about 137,250 acres. This is the latest estimate. Right now that land supports less than 150 families, not more than 900 people at 6 per family.

The average Navaho family includes 5 or 6 people. These people live by raising sheep. The land without irrigation is some of the least productive on the reservation. If this Navaho project goes through the same land will support on farms 1,110 families, or 6,660 people at 6 per family.

The Bureau of Reclamation says every person living on an irrigated farm will support 8 people in town, that is, 8 businessmen, grocers, garage mechanics, carpenters, bankers, and so on, and their families. If only 2 out of the 8 are Navahos, the Navaho project will support 12,000 Navahos in towns that will be built up near the farms. That is a total of 19,980 Navahos, figuring 6 people per family, or more than a quarter of our total population. At 5 people per family the total is 16,650 people—or about one-fifth of our population. These people won't live from hand to mouth the way we Navahos live now. They will live just as well as white farm owners. And if that many people move out of the dry parts of the reservation the people that are left behind can run more sheep, and their standard of living will go up, too.

We Navahos want to farm. We want to do anything reasonable to make a better living for our children. Ever since there have been Navahos we have farmed little draws and damp places to grow corn and squash and watermelons for our own use. Where we can get irrigation water we use it now.

We used to farm both sides of the San Juan River until we were persuaded by the Army to go to Fort Sumner in 1863; and when we came back the first thing we did was to dig our irrigation ditches on the south side of the river with wooden shovels. We weren't allowed to go back north of the river.

I am a farmer myself from Shiprock, and my farm is still watered by a ditch my grandfather and his neighbors dug. After the upper Fruitland project was built some of us got water from it, but until then we all got water in ditches we built ourselves. But without this Navaho project there are only about 33,500 acres of irrigated land on the reservation. That is less than a half acre per person.

I have been talking about the whole Navaho project. There are two parts to it—the Shiprock division of 109,000 acres, all in the reservation, and the South San Juan division of 28,250 acres. This division is off the reservation, but most of the people who live there now are Navahos, and the State of New Mexico has suggested that only Navahos be allowed to get farms there. That would take action by you Senators. The Shiprock 3 division will give farms to 1,110 Navahos families. And if only Navahos are allowed to settle in the South San Juan division that will give farms to 290 more Navaho families. That makes up the total of 1,400 families I was talking about.

All the 137,250 acres of the Navaho project are class 1 and class 2 land. There isn't any poor land, class 3 or worse, included in the project. Most of the Navaho people don't know much about irrigated farming, but they know a lot about raising sheep. So we plan when they first go on the new farms they can put them into irrigated pastures and raise sheep. That way, instead of needing 22 acres for a sheep, they can keep 150 sheep on 90 acres and have feed left over for 15 cows. This will also build up the fertility of the land. Then, as they get used to irrigated farming, they can put in whatever crops will bring the most money.

I said most of the Navahos don't know much about irrigated farming yet. That is because most of us have never had any experience running irrigated farms, but when we have a chance we make good farmers.

The Federal Government has spent many million dollars on us Navahos since 1860, and it hasn't solved our problems yet. In fact, until the Navaho-Hopi Rehabilitation Act of 1950 our problems kept getting worse. All this money has been paid out, and there has been no return. This Navaho project is different. It will cost, total, about $212 million. All but about $1,700,000 of that is reimbursable, and will be repaid to the Government in 50 years. Even the nonreimbursable costs will be repaid after that from power revenues of the upper Colorado project, and, finally, there will be a profit to the Government. In other words, this one project will do more toward making the Navaho people self-supporting, equal citizens than anything else the Government has ever done, and in the long run it won't cost the Treasury a cent.

Mr. LITTELL. My own observations are brief. I wish to call attention to the committee again respectfully that the treaty of 1868 provided that each adult head of a family could have 160 acres cultivatable farmland; that each single member could on application receive 80 acres.

There were not then and have never been at any time since sufficient agricultural land to comply with that sober obligation of the United States Government toward its Indian dependents in Navaho land. This is the first opportunity in history where there can be substantial compliance with that ancient treaty obligation.

It is difficult to conceive of the minds of those who made that representation because it really was apparent at that time that it could not be satisfied.

General Sherman, who conducted the treaty negotiations, signed the treaty for the Government, said in a private communication, I believe it is a letter to his brother, that human beings could not even inhabit that area for more than 10 years, partially because of its aridity and remoteness.

That obligation under the treaty of 1868 was keenly felt by the United States Government and by the Congress, which is the keeper of the conscience of the American people, because they made an extensive survey and appropriation in 1892 for a very excellent survey of the irrigable resources of the Navaho Reservation and even appropriated funds to help in its projects which were then contemplated. Unfortunately those funds were very much dissipated by incompetent management which from time to time was a feature of the Bureau administration of these affairs.

Happily not so today.

This survey of 1892 was completely frustrated. There is very interesting documentation in the archives on this whole subject.

The Navahos carried on in their same old way, digging their own ditches and making their own dams. Sam Ahkeah's own father did along the San Juan, and as Senator Watkins knows, and you on the committee know, there is a very rich strip of agricultural land, but in toto amounting to not more than 33,500 acres of irrigable lands.

The Navaho rehabilitation bill certainly by implication and by some direct language raised the hopes of the Navahos again to have this

project, but nothing further has been done to implement it up to this bill. So that the net result is that there is about a third of an acre of farmland for each Navaho.

This project, subject to the feasibility report which is in progress as explained and need not be discussed here, and I certainly would not attempt to discuss the technicalities of it, has at least curtailed the Navaho position to the redemption of about 109,000 acres of land on the Navaho Reservation plus off the reservation of also service to this Navaho population of about 28,250 acres in the San Juan district.

That would mean variously estimated between 1,200 and 1,400 Navaho families or about 8,400 Navahos plus 8 additional persons for everyone making his living on farmland as experience has shown, and raise the estimate of total self-support from some eighteen to twenty-five thousand, or nearly a third of the population, a very substantial element of this population, whereas the same land we are talking about now supports only 150 families, or about 900. That is all, plus the written statement submitted in the record.

I agreed with the chairman to make a very brief statement. I have done so in reference to the Navaho position on this vital project.

The Commissioner of Indian Affairs and Mr. Keesee have covered other facts which I intended to cover, not having the privilege of seeing their statement, so in the interest of brevity I omit that section of the statement.

Senator O'MAHONEY. If there are any further facts which you would like to present to the committee in a written statement, Mr. Littell, we shall be glad to receive them later and make them a portion of the record.

Mr. LITTELL. Thank you.

Senator O'MAHONEY. Are there any questions?

Senator KUCHEL. Mr. Chairman?

Senator O'MAHONEY. Senator Kuchel.

Senator KUCHEL. Mr. Littell, do you have a legal opinion as to the priority of Indian claims to the waters of the Colorado River?

Mr. LITTELL. Yes, Mr. Senator.

Senator KUCHEL. Would you mind giving it to the committee?

Mr. LITTELL. It is very difficult to define, Senator, without a protracted discussion of the case of Winters against the United States, which could take, as any lawyer here knows, a very considerable time. Besides, I think to some extent my answer would be a little theoretical.

Before making a brief reply, notwithstanding that, may I ask the privilege of making this reservation, Mr. Chairman: In view of the fact that I am apparently the only Indian tribal attorney here and in view of the fact that I was not expecting to testify and was only to aid the witnesses who were here and only have just been thrown on this spot as of Sunday morning, I would like to request the privilege of having the statements I make in answer to the Senator's question considered without prejudice to any contention I might hereafter deem it my duty to make as an attorney to the Navahos in the event we do come to grips with the legal issues which may be involved in the division of this water.

I think that is a fair and reasonable request.

Senator O'MAHONEY. Without objection, it is so ordered.

Mr. LITTELL. Senator, in my opinion, the Indians unquestionably have paramount priority of legal position in the division of water rights.

I step aside from historic reasons for that, including the fact that they owned both banks of the San Juan in the past and now are narrowly confined to one bank.

But leaving aside all those historic arguments and looking at their bare legal position, I frankly do not think that there is any such thing today in the complexion, social, economic, and legal rights, which must be brought to bear to get a proper determination of the division of these waters. I do not think that there is any such thing as a bare, naked, legal right.

I think the doctrine of the Winters case recognizing the priority, paramount character of the Indians' claim to the water, might be said to be more of a shield than a sword, again without prejudice to my right to draw it and use it as a sword if I should be wrong in that observation or if we should get into a really tight fight over water rights.

The Navahos do not wish to get into a fight. They are working with their neighbors, as I think everybody on the Commission in the Senate and House committees will agree, and we hope to get what we can get by cooperative effort with our neighbors.

For the practical reasons which your question brought out this morning actually how could they do much else, because the cost transcends anything which the tribe could hope to pay?

Senator KUCHEL. Now, I believe it is true that the compact between the States in the upper Colorado Basin purports to come into some agreement with respect to the uses of water in the upper basin States by Indian tribes with respect to the apportionment of water to those upper basin States.

Do you have an opinion on whether or not the Indian uses are chargeable to apportionment in the States of the lower Colorado River Basin?

Mr. LITTELL. I do not. I would not attempt to pass on that question.

Senator KUCHEL. Do you believe that the answer to that question would have a bearing on the amounts of water apportioned under the Colorado River compact to the lower basin States?

Mr. LITTELL. I think it follows the mathematical manner, Senator, that that could well be true.

Senator KUCHEL. And to that extent would have some relevant place in the discussion of any legislation as is encompassed in S. 500?

Mr. LITTELL. Yes. I think that whole line of discussion is represented by the feasibility reports which have been discussed here and are in process for distribution 30 days hence and probably reporting back in another 120 days.

Senator KUCHEL. Thank you very much.

Senator O'MAHONEY. Are there any other questions?

Senator Watkins.

Senator WATKINS. I have none.

Senator O'MAHONEY. Thank you very much, Mr. Littell.

Is Mr. Valkenberg here?

Mr. LITTELL. He will not testify. We agreed with Senator Anderson yesterday to confine our testimony to one witness.

TEXT OF COLORADO RIVER COMPACT

Senator WATKINS. Mr. Chairman, I think it would be of great convenience to the Members of the Congress, particularly the Senate, if we would have placed in the record the Colorado River compact of 1922 and the upper Colorado River Basin compact of 1948.

If it can be printed in the hearings they will be a great convenience to the Members of the Senate.

Senator O'MAHONEY. They will be received and printed in the record.

(The information referred to follows:)

No. 6225

UNITED STATES OF AMERICA

DEPARTMENT OF STATE

To all to whom these presents shall come, Greeting:

I certify that the document annexed is a true copy of the "Colorado River Compact," signed 24th November 1922, at the City of Santa Fe, New Mexico, the original of which is on file in this Department.

In testimony whereof I, Charles E. Hughes, Secretary of State, have hereunto caused the seal of the Department of State to be affixed and my name subscribed by the Chief Clerk of the said Department, at the City of Washington, this twenty-second day of December 1922.

[SEAL]

CHARLES E. HUGHES,
Secretary of State.
By BEN G. DAVIS,
Chief Clerk.

COLORADO RIVER COMPACT

The States of Arizona, California, Colorado, Nevada, New Mexico, Utah, and Wyoming, having resolved to enter into a compact under the act of the Congress of the United States of America approved August 19, 1921 (42 Statutes at Large, p. 171), and the acts of the legislatures of the said States, have through their governors appointed as their commissioners:

W. S. Norviel for the State of Arizona
W. F. McClure for the State of California
Delph E. Carpenter for the State of Colorado
J. G. Scrugham for the State of Nevada
Stephen B. Davis, Jr., for the State of New Mexico
R. E. Caldwell for the State of Utah
Frank C. Emerson for the State of Wyoming

who, after negotiations participated in by Herbert Hoover appointed by the President as the representative of the United States of America, have agreed upon the following articles:

The major purposes of this compact are to provide for the equitable division and apportionment of the use of the waters of the Colorado River System; to establish the relative importance of different beneficial uses of water; to promote interstate comity; to remove causes of present and future controversies, and to secure the expeditious agricultural and industrial development of the Colorado River Basin, the storage of its waters, and the protection of life and property from floods. To these ends the Colorado River Basin is divided into two basins, and an apportionment of the use of part of the water of the Colorado River System is made to each of them with the provision that further equitable apportionments may be made.

ARTICLE II

As used in this compact—

(a) The term "Colorado River System" means that portion of the Colorado River and its tributaries within the United States of America.

(b) The term "Colorado River Basin" means all of the drainage area of the Colorado River System and all other territory within the United States of America to which the waters of the Colorado River System shall be beneficially applied.

(c) The term "States of the Upper Division" means the States of Colorado, New Mexico, Utah, and Wyoming.

(d) The term "States of the Lower Division" means a point in the main stream of the Colorado River one mile below the mouth of the Paria River.

(f) The term "Upper Basin" means those parts of the States of Arizona, Colorado, New Mexico, Utah, and Wyoming within and from which waters naturally drain into the Colorado River System above Lee Ferry, and also all parts of said States located without the drainage area of the Colorado River System which are now or shall hereafter be beneficially served by waters diverted from the system above Lee Ferry.

(g) The term "Lower Basin" means those parts of the States of Arizona, California, Nevada, New Mexico, and Utah within and from which waters naturally drain into the Colorado River System below Lee Ferry, and also all parts of said States located without the drainage area of the Colorado River System which are now or shall hereafter be beneficially served by waters diverted from the system below Lee Ferry.

(h) The term "domestic use" shall include the use of water for household, stock, municipal, mining, milling, industrial, and other like purposes, but shall exclude the generation of electrical power.

ARTICLE III

(a) There is hereby apportioned from the Colorado River System in perpetuity to the Upper Basin and the Lower Basin, respectively, the exclusive beneficial consumptive use of 7,500,000 acre-feet of water per annum, which shall include all water necessary for the supply of any rights which may now exist.

(b) In addition to the apportionment in paragraph (a), the Lower Basin is hereby given the right to increase its beneficial consumptive use of such waters by 1 million acre-feet per annum.

(c) If, as a matter of international comity, the United States of America shall hereafter recognize in the United States of Mexico any right to the use of any waters of the Colorado River System, such waters shall be supplied first from the waters which are surplus over and above the aggregate of the quantities specified in paragraphs (a) and (b); and if such surplus shall prove insufficient for this purpose, then the burden of such deficiency shall be equally borne by the Upper Basin and the Lower Basin, and whenever necessary the States of the Upper Division shall deliver at Lee Ferry water to supply one-half of the deficiency so recognized in addition to that provided in paragraph (d).

(d) The States of the Upper Division will not cause the flow of the river at Lee Ferry to be depleted below an aggregate of seventy-five million acre-feet for any period of ten consecutive years reckoned in continuing progressive series beginning with the first day of October next succeeding the ratification of this compact.

(e) The States of the Upper Division shall not withhold water, and the States of the Lower Division shall not require the delivery of water, which cannot reasonably be applied to domestic and agricultural uses.

(f) Further equitable apportionment of the beneficial uses of the waters of the Colorado River System unapportioned by paragraphs (a), (b), and (c), may be made in the manner provided in paragraph (g) at any time after October 1, 1963, if and when either Basin shall have reached its total beneficial consumptive use as set out in paragraphs (a) and (b).

(g) In the event of a desire for a further apportionment as provided in paragraph (f) any two signatory States, acting through their governors, may give joint notice of such desire to the governors of the other signatory States and to the President of the United States of America, and it shall be the duty of the governors of the signatory States and of the President of the United States of America forthwith to appoint representatives, whose duty it shall be to divide and apportion equitably between the Upper Basin and Lower Basin the beneficial use of the unapportioned water of the Colorado River System as mentioned in paragraph (f), subject to the legislative ratification of the signatory States and the Congress of the United States of America.

ARTICLE IV

(a) Inasmuch as the Colorado River has ceased to be navigable for commerce and the reservation of its waters for navigation would seriously limit the development of its Basin, the use of its waters for purposes of navigation shall be subservient to the uses of such water for domestic, agricultural, and power purposes. If the Congress shall not consent to this paragraph, the other provisions of this compact shall nevertheless remain binding.

(b) Subject to the provisions of this compact, water of the Colorado River System may be impounded and used for the generation of electrical power, but such impounding and use shall be subservient to the use and consumption of such water for agricultural and domestic purposes and shall not interfere with or prevent use for such dominant purposes.

(c) The provisions of this article shall not apply to or interfere with the regulation and control by any State within its boundaries of the appropriation, use, and distribution of water.

ARTICLE V

The chief official of each signatory State charged with the administration of water rights, together with the Director of the United States Reclamation Service and the Director of the United States Geological Survey shall cooperate, ex officio:

(a) To promote the systematic determination and coordination of the facts as to flow, appropriation, consumption, and use of water in the Colorado River Basin, and the interchange of available information in such matters.

(b) To secure the ascertainment and publication of the annual flow of the Colorado River at Lee Ferry.

(c) To perform such other duties as may be assigned by mutual consent of the signatories from time to time.

ARTICLE VI

Should any claim or controversy arise between any two or more of the signatory States:

(a) with respect to the waters of the Colorado River System not covered by the terms of this compact;

(b) over the meaning or performance of any of the terms of this compact;

(c) as to the allocation of the burdens incident to the performance of any article of this compact or the delivery of waters as herein provided;

(d) as to the construction or operation of works within the Colorado River Basin to be situated in two or more States, or to be constructed in one State for the benefit of another State; or

(e) as to the diversion of water in one State for the benefit of another State; the governors of the States affected, upon the request of one of them, shall forthwith appoint commissioners with power to consider and adjust such claim or controversy, subject to ratification by the legislatures of the States so affected.

Nothing herein contained shall prevent the adjustment of any such claim or controversy by any present method or by direct future legislative action of the interested States.

ARTICLE VII

Nothing in this compact shall be construed as affecting the obligations of the United States of America to Indian tribes.

ARTICLE VIII

Present perfected rights to the beneficial use of waters of the Colorado River System are unimpaired by this compact. Whenever storage capacity of 5 million acre-feet shall have been provided on the main Colorado River within or for the benefit of the Lower Basin, then claims of such rights, if any, by appropriators or users of water in the Lower Basin against appropriators or users of water in the Upper Basin shall attach to and be satisfied from water that may be stored not in conflict with article III.

All other rights to beneficial use of waters of the Colorado River System shall be satisfied solely from the water apportioned to that Basin in which they are situate.

ARTICLE IX

Nothing in this compact shall be construed to limit or prevent any State from instituting or maintaining any action or proceeding, legal, or equitable, for the protection of any right under this compact or the enforcement of any of its provisions.

ARTICLE X

This compact may be terminated at any time by the unanimous agreement of the signatory States. In the event of such termination all rights established under it shall continue unimpaired.

ARTICLE XI

This compact shall become binding and obligatory when it shall have been approved by the legislatures of each of the signatory States and by the Congress of the United States. Notice of approval by the legislatures shall be given by the governor of each signatory State to the governors of the other signatory States and to the President of the United States, and the President of the United States is requested to give notice to the governors of the signatory States of approval by the Congress of the United States.

In witness whereof, the Commissioners have signed this compact in a single original, which shall be deposited in the archives of the Department of State of the United States of America and of which a duly certified copy shall be forwarded to the governor of each of the signatory States.

Done at the city of Santa Fe, New Mexico, this twenty-fourth day of November, A. D., One Thousand Nine Hundred and Twenty-two.

(Signed) W. S. Norviel.
(Signed) W. F. McClure.
(Signed) Delph E. Carpenter.
(Signed) J. G. Scrugham.
(Signed) Stephen B. Davis, Jr.
(Signed) R. E. Caldwell.
(Signed) Frank C. Emerson.

Approved:

Herbert Hoover.

Appendix 231

The Colorado River Compact

Text of the Upper Colorado River Basin Compact (Entered Into by the States of Arizona, Colorado, New Mexico, Utah, and Wyoming, at Santa Fe, New Mexico, October 11, 1948)

The State of Arizona, the State of Colorado, the State of New Mexico, the State of Utah, and the State of Wyoming, acting through their Commissioners,

Charles A. Carson for the State of Arizona
Clifford H. Stone for the State of Colorado
Fred E. Wilson for the State of New Mexico
Edward H. Watson for the State of Utah, and
L. C. Bishop for the State of Wyoming

after negotiations participated in by Harry W. Bashore, appointed by the President as the representative of the United States of America, have agreed, subject to the provisions of the Colorado River Compact, to determine the rights and obligations of each signatory State respecting the uses and deliveries of the water of the Upper Basin of the Colorado River, as follows:

ARTICLE I

(a) The major purposes of this compact are to provide for the equitable division and apportionment of the use of the waters of the Colorado River System, the use of which was apportioned in perpetuity to the Upper Basin by the Colorado River Compact; to establish the obligations of each State of the Upper Division with respect to the deliveries of water required to be made at

Lee Ferry by the Colorado River Compact; to promote interstate comity; to remove causes of present and future controversies; to secure the expeditious agricultural and industrial development of the Upper Basin, the storage of water and to protect life and property from floods.

(b) It is recognized that the Colorado River Compact is in full force and effect and all of the provisions hereof are subject thereto.

ARTICLE II

As used in this compact:

(a) The term "Colorado River System" means that portion of the Colorado River and its tributaries within the United States of America.

(b) The term "Colorado River Basin" means all of the drainage area of the Colorado River System and all other territory within the United States of America to which the waters of the Colorado River System shall be beneficially applied.

(c) The term "States of the Upper Division" means the States of Colorado, New Mexico, Utah, and Wyoming.

(d) The term "States of the Lower Division" means the States of Arizona, California, and Nevada.

(e) The term "Lee Ferry" means a point in the main stream of the Colorado River one mile below the mouth of the Paria River.

(f) The term "Upper Basin" means those parts of the States of Arizona, Colorado, New Mexico, Utah, and Wyoming within and from which waters naturally drain into the Colorado River System above Lee Ferry, and also all parts of said States located without the drainage area of the Colorado River System which are now or shall hereafter be beneficially served by waters diverted from the Colorado River System above Lee Ferry.

(g) The term "Lower Basin" means those parts of the States of Arizona, California, Nevada, New Mexico, and Utah within and from which waters naturally drain into the Colorado River System below Lee Ferry, and also all parts of said States located without the drainage area of the Colorado River System which are now or shall hereafter be beneficially served by waters diverted from the Colorado River System below Lee Ferry.

(h) The term "Colorado River Compact" means the agreement concerning the apportionment of the use of the waters of the Colorado River System dated November 24, 1922, executed by commissioners for the States of Arizona, California, Colorado, Nevada, New Mexico, Utah, and Wyoming, approved by Herbert Hoover, representative of the United States of America, and proclaimed effective by the President of the United States of America, June 25, 1929.

(i) The term "Upper Colorado River System" means that portion of the Colorado River System above Lee Ferry.

(j) The term "Commission" means the administrative agency created by article VIII of this compact.

(k) The term "water year" means that period of 12 months ending September 30 of each year.

(l) The term "acre-foot" means the quantity of water required to cover an acre to the depth of 1 foot and is equivalent to 43,560 cubic feet.

(m) The term "domestic use" shall include the use of water for household, stock, municipal, mining, milling, industrial and other like purposes, but shall exclude the generation of electrical power.

(n) The term "virgin flow" means the flow of any stream undepleted by the activities of man.

ARTICLE III

(a) Subject to the provisions and limitations contained in the Colorado River Compact and in this compact, there is hereby apportioned from the Upper Colorado River System in perpetuity to the States of Arizona, Colorado, New Mexico, Utah, and Wyoming, respectively, the consumptive use of water as follows:

1. To the State of Arizona the consumptive use of fifty thousand acre-feet of water per annum.

2. To the States of Colorado, New Mexico, Utah, and Wyoming, respectively, the consumptive use per annum of the quantities resulting from the application of the following percentages to the total quantity of consumptive use per annum apportioned in perpetuity to and available for use each year by Upper Basin [sic] under the Colorado River Compact and remaining after the deduction of the use, not to exceed fifty thousand acre-feet per annum, made in the State of Arizona.

State of Colorado, 51.75 percent.
State of New Mexico, 11.25 percent.
State of Utah, 23.00 percent.
State of Wyoming, 14.00 percent.

(b) The apportionment made to the respective States by paragraph (a) of this article is based upon, and shall be applied in conformity with, the following principles and each of them:

1. The apportionment is of any and all man-made depletions;

2. Beneficial use is the basis, the measure, and the limit of the right to use;

3. No State shall exceed its apportioned use in any water year when the effect of such excess use, as determined by the Commission, is to deprive another signatory State of its apportioned use during that water year: *Provided*, That this subparagraph (b) (3) shall not be construed as—

(i) Altering the apportionment of use, or obligations to make deliveries as provided in articles XI, XII, XIII, or XIV of this compact;

(ii) Purporting to apportion among the signatory States such uses of water as the Upper Basin may be entitled to under paragraphs (f) and (g) of article III of the Colorado River Compact; or

(iii) Countenancing average uses by any signatory State in excess of its apportionment.

(4) The apportionment to each State includes all water necessary for the supply of any rights which now exist.

(c) No apportionment is hereby made, or intended to be made, of such uses of water as the Upper Basin may be entitled to under paragraphs (f) and (g) of article III of the Colorado River Compact.

(d) The apportionment made by this article shall not be taken as any basis for the allocation among the signatory States of any benefits resulting from the generation of power.

ARTICLE IV

In the event curtailment of use of water by the States of the Upper Division at any time shall become necessary in order that the flow at Lee Ferry shall not be depleted below that required by article III of the Colorado River Compact, the extent of curtainment by each State of the consumptive use of water apportioned to it by article III of this compact shall be in such quantities and at such times as shall be determined by the Commission upon the application of the following principles:

(a) The extent and times of curtailment shall be such as to assure full compliance with article III of the Colorado River Compact;

(b) If any State or States of the Upper Division, in the ten years immediately preceding the water year in which curtailment is necessary, shall have consumptively used more water than it was or they were, as the case may be, entitled to use under the apportionment made by article III of this compact, such State or States shall be required to supply at Lee Ferry a quantity of water equal to its, or the aggregate of their, overdraft or the proportionate part of such overdraft, as may be necessary to assure compliance with article III of the Colorado River Compact, before demand is made on any other State of the Upper Division;

(c) Except as provided in subparagraph (*b*) of this article, the extent of curtailment by each State of the Upper Division of the consumptive use of water apportioned to it by article III of this compact shall be such as to result in the delivery at Lee Ferry of a quantity of water which bears the same relation to the total required curtailment of use by the States of the Upper Division as the consumptive use of the Upper Colorado River System water which was made by each State during the water year immediately preceding the year in which the curtailment becomes necessary bears to the total consumptive use of such water in the States of the Upper Division during the same water year; provided, that in determining such relation the uses of water under rights perfected prior to November 24, 1922, shall be excluded.

ARTICLE V

(a) All losses of water occurring from or as the result of the storage of water in reservoirs constructed prior to the signing of this compact shall be charged to the State in which such reservoir or reservoirs are located. Water stored in reservoirs covered by this paragraph (a) shall be for the exclusive use of and shall be charged to the State in which the reservoir or reservoirs are located.

(b) All losses of water occurring from or as the result of the storage of water in reservoirs constructed after the signing of this compact shall be charged as follows:

1. If the Commission finds that the reservoir is used, in whole or in part, to assist the States of the Upper Division in meeting their obligations to deliver water at Lee Ferry imposed by article III of the Colorado River Compact, the Commission shall make findings, which in no event shall be contrary to the laws of the United States of America under which any reservoir is constructed, as to the reservoir capacity allocated for that purpose. The whole or that proportion, as the case may be, of reservoir losses as found by the Commission to be reasonably and properly chargeable to the reservoir or reservoir capacity utilized to assure deliveries at Lee Ferry shall be charged to the States of the Upper Division in the proportion which the consumptive use of water in each State of the Upper Division during the water year in which the charge is made bears to the total consumptive use of water in all States of the Upper Division during the same water year. Water stored in reservoirs or in reservoir capacity covered by this subparagraph (b) (1) shall be for the common benefit of all of the States of the Upper Division.

2. If the Commission finds that the reservoir is used, in whole or in part, to supply water for use in a State of the Upper Division, the Commission shall make findings, which in no event shall be contrary to the laws of the United States of America under which any reservoir is constructed, as to the reservoir or reservoir capacity utilized to supply water for use and the State in which such water will be used. The whole or that proportion, as the case may be, of reservoir losses as found by the Commission to be reasonably and properly chargeable to the State in which such water will be used shall be borne by that State. As determined by the Commisison, water stored in reservoirs covered by this subparagraph (b) (2) shall be earmarked for and charged to the State in which the water will be used.

(c) In the event the Commission finds that a reservoir site is available both to assure deliveries at Lee Ferry and to store water for consumptive use in a State of the Upper Division, the storage of water for consumptive use shall be given preference. Any reservoir or reservoir capacity hereafter used to assure deliveries at Lee Ferry shall by order of the Commission be used to store water for consumptive use in a State, provided the Commission finds that such storage is reasonably necessary to permit such State to make the use of the water apportioned to it by this compact.

ARTICLE IV

The Commission shall determine the quantity of the consumptive use of water, which use is apportioned by article III hereof, for the upper basin and for each State of the upper basin by the inflow-outflow method in terms of manmade depletions of the virgin flow at Lee Ferry, unless the Commission, by unanimous action, shall adopt a different method of determination.

ARTICLE VII

The consumptive use of water by the United States of America or any of its agencies, instrumentalities, or wards shall be charged as a use by the State in which the use is made: *Provided*, That such consumptive use incident to the diversion, impounding, or conveyance of water in one State for use in another shall be charged to such latter State.

ARTICLE VIII

(a) There is hereby created an interstate administrative agency to be known as the Upper Colorado River Commission. The Commission shall be composed of one Commissioner representing each of the States of the Upper Division, namely, the States of Colorado, New Mexico, Utah, and Wyoming, designated or appointed in accordance with the laws of each such State, and if designated by the President, one Commissioner representing the United States of America. The President is hereby requested to designate a Commissioner. If so designated the Commissioner representing the United States of America shall be the presiding officer of the Commission and shall be entitled to the same powers and rights as the Commissioner of any State. Any four members of the Commission shall constitute a quorum.

(b) The salaries and personal expenses of each Commissioner shall be paid by the government which he represents. All other expenses which are incurred by the Commission incident to the administration of this compact, and which are not paid by the United States of America, shall be borne by the four States according to the percentage of consumptive use apportioned to each. On or before December 1 of each year, the Commission shall adopt and transmit to the governors of the four States and to the President a budget covering an estimate of its expenses for the following year, and of the amount payable by each State. Each State shall pay the amount due by it to the Commission on or before April 1 of the year following. The payment of the expenses of the Commission and of its employees shall not be subject to the audit and accounting procedures of any of the four States; however, all receipts and disbursement of funds handled by the Commission shall be audited yearly by a qualified independent public accountant and the report of the audit shall be included in and become a part of the annual report of the Commission.

(c) The Commission shall appoint a secretary, who shall not be a member of the Commission, or an employee of any signatory State or of the United States of America while so acting. He shall serve for such terms and receive such salary and perform such duties as the Commission may direct. The Commission may employ such engineering, legal, clerical, and other personnel as, in its judgment, may be necessary for the performance of its functions under this compact. In the hiring of employees, the Commission shall not be bound by the civil service laws of any State.

(d) The Commission, so far as consistent with this compact, shall have the power to:

1. Adopt rules and regulations;

2. Locate, establish, construct, abandon, operate and maintain water gaging stations;

3. Make estimates to forecast water runoff on the Colorado River and any of its tributaries;

4. Engage in cooperative studies of water supplies of the Colorado River and its tributaries;

5. Collect, analyze, correlate, preserve, and report on data as to the stream flows, storage, diversions and use of the waters of the Colorado River, and any of its tributaries;

6. Make findings as to the quantity of water of the Upper Colorado River System used each year in the Upper Colorado River Basin and in each State thereof;

7. Make findings as to the quantity of water deliveries at Lee Ferry during each water year;

8. Make findings as to the necessity for and the extent of the curtailment of use, required, if any, pursuant to reservoir losses and as to the share thereof chargeable under article V hereof to each of the States;

10. Make findings of fact in the event of the occurrence of extraordinary drought or serious accident to the irrigation system in the Upper Basin, whereby deliveries by the Upper Basin of water which it may be required to deliver in order to aid in fulfilling obligations of the United States of America to the United Mexican States arising under the treaty between the United States of America and the United Mexican States, dated February 3, 1944 (Treaty Series 994) become difficult, and report such findings to the governors of the Upper Basin States, the President of the United States of America, the United States Section of the International Boundary and Water Commission, and such other Federal officials and agencies as it may deem appropriate to the end that the water allotted to Mexico under division III of such treaty may be reduced in accordance with the terms of such treaty;

11. Acquire and hold such personal and real property as may be necessary for the performance of its duties hereunder and to dispose of the same when no longer required;

12. Perform all functions required of it by this compact and do all things necessary, proper, or convenient in the performance of its duties hereunder, either independently or in cooperation with any State or Federal agency;

13. Make and transmit annually to the governors of the signatory States and the President of the United States of America, with the estimated budget, a report covering the activities of the Commission for the preceding water year.

(e) Except as otherwise provided in this compact the concurrence of four members of the Commission shall be required in any action taken by it.

(f) The Commission and its secretary shall make available to the governor of each of the signatory States any information within its possession at any time, and shall always provide free access to its records by the governors of each of the States, or their representatives, or authorized representatives of the United States of America.

(g) Findings of fact made by the Commission shall not be conclusive in any court, or before any agency or tribunal, but shall constitute prima facie evidence of the facts found.

(h) The organization meeting of the Commission shall be held within four months from the effective date of this compact.

ARTICLE IX

(a) No State shall deny the right of the United States of America and, subject to the conditions hereinafter contained, no State shall deny the right of another signatory State, any person, or entity of any signatory State to acquire rights to the use of water, or to construct or participate in the construction and use of diversion works and storage reservoirs with appurtenant works, canals, and conduits in one State for the purpose of diverting, conveying, storing, regulation and releasing water to satisfy the provisions of the Colorado River Compact relating to the obligation of the States of the Upper Division to make deliveries of water at Lee Ferry, or for the purpose of diverting, conveying, storing, or regulating water in an upper signatory State for consumptive use in a lower signatory State, when such use is within the apportionment to such lower State made by this compact. Such rights shall be subject to the rights of water users, in a State in which such reservoir or works are located, to receive and use water, the use of which is within the apportionment to such State by this compact.

(b) Any signatory State, any person or any entity of any signatory State shall have the right to acquire such property rights as are necessary to the use of water in conformity with this compact in any other signatory State by donation, purchase, or through the exercise of the power of eminent domain. Any signatory State, upon the written request of the governor of any other signatory State, for the benefit of whose water users property is to be acquired in the State to which such written request is made, shall proceed expeditiously to acquire the desired property either by purchase at a price satisfactory to the requesting State, or, if such purchase cannot be made, then through the exercise of its power of eminent domain and shall convey such property to the requesting State or such entity as may be designated by the requesting State: *Provided*, That all costs of acquisition and expense of every kind and nature whatsoever incurred in obtaining the requested property shall be paid by the requesting State at the time and in the manner prescribed by the State requested to acquire the property.

(c) Should any facility be constructed in a signatory State by and for the benefit of another signatory State or States or the water users thereof, as above provided, the construction, repair, replacement, maintenance, and operation of such facility shall be subject to the laws of the State in which the facility is located, except that, in the case of a reservoir constructed in one State for the benefit of another State or States, the water administration officials of the State in which the facility is located shall permit the storage and release of any water which, as determined by findings of the Commission, falls within the apportionment of the State or States for whose benefit the facility is constructed. In the case of a regulating reservoir for the joint benefit of all States in making Lee Ferry deliveries, the water administration officials of the State in which the facility is located, in permitting the storage and release of water, shall comply with the findings and orders of the Commission.

(d) In the event property is acquired by a signatory State in another signatory State for the use and benefit of the former, the users of water made available by such facilities, as a condition precedent to the use thereof, shall pay to the political subdivisions of the State in which such works are located, each and every year during which such rights are enjoyed for such purposes, a sum of money equivalent to the average annual amount of taxes levied and assessed against the land and improvements thereon during the ten years preceding the acquisition of such land. Said payments shall be in full reimbursement for the loss of taxes in such political subdivisions of the State, and in lieu of any and all taxes on said property, improvements and rights. The signatory States recommend to the President and the Congress that, in the event the United States

of America shall acquire property in one of the signatory States for the benefit of another signatory State, or its water users, provision be made for like payment in reimbursement of loss of taxes.

ARTICLE X

(*a*) The signatory States recognize La Plata River Compact [sic] entered into between the States of Colorado and New Mexico, dated November 27, 1922, approved by the Congress on January 29, 1925 (43 Stat. 796), and this compact shall not affect the apportionment therein made.

(*b*) All consumptive use of water of La Plata River and its tributaries shall be charged under the apportionment of article III hereof to the State in which the use is made: *Provided*, That consumptive use incident to the diversion, impounding or conveyance of water in one State for use in the other shall be charged to the latter State.

ARTICLE XI

Subject to the provisions of this compact, the consumptive use of the water of the Little Snake River and its tributaries is hereby apportioned between the States of Colorado and Wyoming in such quantities as shall result from the application of the following principles and procedures:

(*a*) Water used under rights existing prior to the signing of this compact.

(1) Water diverted from any tributary of the Little Snake River or from the main stem of the Little Snake River above a point one hundred feet below the confluence of Savery Creek and the Little Snake River shall be administered without regard to rights covering the diversion of water from any downstream points.

(2) Water diverted from the main stem of the Little Snake River below a point one hundred feet below the confluence of Savery Creek and the Little Snake River shall be administered on the basis of an interstate priority schedule prepared by the Commission in conformity with priority dates established by the laws of the respective States.

(*b*) Water used under rights initiated subsequent to the signing of this compact.

(1) Direct flow diversions shall be so administered that, in time of shortage, the curtailment of use on each acre of land irrigated thereunder shall be as nearly equal as may be possible in both the States.

(2) The storage of water by projects located in either State, whether of supplemental supply or of water used to irrigate land not irrigated at the date of the signing of this compact, shall be so administered that in times of water shortage the curtailment of storage of water available for each acre of land irrigated thereunder shall be as nearly equal as my be possible in both States.

(c) Water uses the apportionment made by this article shall be in accordance with the principle that beneficial use shall be the basis, measure, and limit of the right to use.

(d) The States of Colorado and Wyoming each assent to diversions and storage of water in one State for use in the other State, subject to compliance with article IX of this compact.

(e) In the event of the importation of water to the Little Snake River Basin from any other river basin, the State making the importation shall have the exclusive use of such imported water unless by written agreement, made by the representatives of the States of Colorado and Wyoming on the Commission, it is otherwise provided.

(f) Water use projects initiated after the signing of this compact, to the greatest extent possible, shall permit the full use within the Basin in the most feasible manner of the waters of the Little Snake River and its tributaries, without regard to the State line, and, so far as is practicable, shall result in an equal division between the States of the use of water not used under rights existing prior to the signing of this compact.

(g) All consumptive use of the waters of the Little Snake River and its tributaries shall be charged under the apportionment of article III hereof to the State in which the use is made: *Provided*, That consumptive use incident to the diversion, impounding or conveyance of water in one State for use in the other shall be charged to the latter State.

ARTICLE XII

Subject to the provisions of this compact, the consumptive use of the waters of Henry's Fork, a tributary of Green River originating in the State of Utah and flowing into the State of Wyoming and thence into the Green River in the State of Utah; Beaver Creek, originating in the State of Utah and flowing into Henry's Fork in the State of Wyoming; Burnt Fork, a tributary of Henry's Fork originating in the State of Utah and flowing into Henry's Fork in the State of Wyoming; Birch Creek, a tributary of Henry's Fork originating in the State of Utah and flowing into Henry's Fork in the State of Wyoming, and Sheep Creek, a tributary of Green River in the State of Utah, and their tributaries, are hereby apportioned between the States of Utah and Wyoming in such quantities as will result from the application of the following principles and procedures:

(a) Waters used under rights existing prior to the signing of this compact. Waters diverted from Henry's Fork, Beaver Creek, Burnt Fork, Birch Creek, and their tributaries, shall be administered without regard to the State line on the basis of an interstate priority schedule to be prepared by the States affected and approved by the Commission in conformity with the actual priority of right of use, the water requirements of the land irrigated and the acreage irrigated in connection therewith.

(b) Waters used under rights from Henry's Fork, Beaver Creek, Burnt Fork, Birch Creek and their tributaries, initiated after the signing of this compact, shall be divided 50 percent to the State of Wyoming and 50 percent to the State of Utah and each State may use said waters as and where it deems advisable.

(c) The State of Wyoming assents to the exclusive use by the State of Utah of the water of Sheep Creek, except that the lands, if any, presently irrigated in the State of Wyoming from the water of Sheep Creek shall be supplied with water from Sheep Creek in order of priority and in such quantities as are in conformity with the laws of the State of Utah.

(d) In the event of the importation of water to Henry's Fork, or any of its tributaries, from any other river basin, the State making the importation shall have the exclusive use of such imported water unless by written agreement made by the representatives of the States of Utah and Wyoming on the Commission it is otherwise provided.

(e) All consumptive use of waters of Henry Fork, Beaver Creek, Burnt Fork, Birch Creek, Sheep Creek, and their tributaries shall be charged under the apportionment of article III hereof to the State in which the use is made: *Provided*, That consumptive use incident to the diversion, impounding or conveyance of water in one State for use in the other shall be charged to the latter State.

(f) The States of Utah and Wyoming each assent to the diversion and storage of water in one State for use in the other State, subject to compliance with article IX of this compact. It shall be the duty of the water administrative officials of the State where the water is stored to release said stored water to the other State upon demand. If either the State of Utah or the State of Wyoming shall construct a reservoir in the other State for use in its own State, the water users of the State in which said facilities are constructed may purchase at cost a portion of the capacity of said reservoir sufficient for the irrigation of their lands thereunder.

(g) In order to measure the flow of water diverted, each State shall cause suitable measuring devices to be constructed, maintained and operated at or near the point of diversion into each ditch.

(h) The State engineers of the two Sates jointly shall appoint a special water commissioner who shall have authority to administer the water in both States in accordance with the terms of this article. The salary and expenses of such special water commissioner shall be paid, 30 percent by the State of Utah and 70 percent by the State of Wyoming.

ARTICLE XIII

Subject to the provisions of this compact, the rights to the consumptive use of the water of the Yampa River, a tributary entering the Green River in the State of Colorado, are hereby apportioned between the States of Colorado and Utah in accordance with the following principles:

(a) The State of Colorado will not cause the flow of the Yampa River at the Maybell Gaging Station to be depleted below an aggregate of five million acre-

feet for any period of ten consecutive years reckoned in continuing progressive series beginning with the first day of October next succeeding the ratification and approval of this compact. In the event any diversion is made from the Yampa River or from tributaries entering the Yampa River above the Maybell Gaging Station for the benefit of any water use project in the State of Utah, then the gross amount of all such diversions for use in the State of Utah, less any returns from such diversions to the river above Maybell, shall be added to the actual flow at the Maybell Gaging Station to determine the total flow at the Maybell Gaging Station.

(b) All consumptive use of the waters of the Yampa River and its tributaries shall be charged under the apportionment of article III hereof to the State in which the use is made: *Provided*, That consumptive use incident to the diversion, impounding or conveyance of water in one State for use in the other shall be charged to the latter State.

ARTICLE XIV

Subject to the provisions of this compact, the consumptive use of the waters of the San Juan River and its tributaries is hereby apportioned between the States of Colorado and New Mexico as follows:

The State of Colorado agrees to deliver to the State of New Mexico from the San Juan River and its tributaries which rise in the State of Colorado a quantity of water which shall be sufficient, together with water originating in the San Juan Basin in the State of New Mexico, to enable the State of New Mexico to make full use of the water apportioned to the State of New Mexico by article III of this compact, subject, however, to the following:

(a) A first and prior right shall be recognized as to:

(1) All uses of water made in either State at the time of the signing of this compact; and

(2) All uses of water contemplated by projects authorized, at the time of the signing of this compact, under the laws of the United States of America, whether or not such projects are eventually constructed by the United States of America or by some other entity.

(b) The State of Colorado assents to diversions and storage of water in the State of Colorado for use in the State of New Mexico, subject to compliance with article IX of this compact.

(c) The uses of the waters of the San Juan River and any of its tributaries within either State which are dependent upon a common source of water and which are not covered by (a) hereof, shall in times of water shortages be reduced in such quantity that the resulting consumptive use in each State will bear the same proportionate relation to the consumptive use made in each State during times of average water supply as determined by the Commission; provided, that any preferential uses of water to which Indians are entitled under article XIX shall be excluded in determining the amount of curtailment to be made under this paragraph.

(d) The curtailment of water use by either State in order to make deliveries at Lee Ferry as required by article IV of this compact shall be independent of any and all conditions imposed by this article and shall be made by each State, as and when required, without regard to any provision of this article.

(e) All consumptive use of the waters of the San Juan River and its tributaries shall be charged under the apportionment of article III hereof to the State in which the use is made; provided, that consumptive use incident to the diversion, impounding, or conveyance of water in one State for use in the other shall be charged to the latter State.

ARTICLE XV

(a) Subject to the provisions of the Colorado River Compact and of this compact, water of the Upper Colorado River System may be impounded and used for the generation of electrical power, but such impounding and use shall be subservient to the use and consumption of such water for agricultural and domestic purposes, and shall not interfere with or prevent use for such dominant purposes.

(b) The provisions of this compact shall not apply to or interfere with the right or power of any signatory State to regulate within its boundaries the appropriation, use and control of water, the consumptive use of which is apportioned and available to such State by this compact.

ARTICLE XVI

The failure of any State to use the water, or any part thereof, the use of which is apportioned to it under the terms of this compact, shall not constitute a relinquishment of the right to such use to the Lower Basin or to any other State, nor shall it constitute a forfeiture or abandonment of the right to such use.

ARTICLE XVII

The use of any water now or hereafter imported into the natural drainage basin of the Upper Colorado River System shall not be charged to any State under the apportionment of consumptive use made by this compact.

ARTICLE XVIII

(a) The State of Arizona reserves its rights and interests under the Colorado River Compact as a State of the Lower Division and as a State of the Lower Basin.

(b) The State of New Mexico and the State of Utah reserve their respective rights and interests under the Colorado River Compact as States of the Lower Basin.

ARTICLE XIX

Nothing in this compact shall be construed as:

(a) Affecting the obligations of the United States of America to Indian tribes;

(b) Affecting the obligations of the United States of America under the treaty with the United Mexican States (Treaty Series 994);

(c) Affecting any rights or powers of the United States of America, its agencies or instrumentalities, in or to the waters of the Upper Colorado River System, or its capacity to acquire rights in and to the use of said waters;

(d) Subjecting any property of the United States of America, its agencies or instrumentalities, to taxation by any State or subdivision thereof, or creating any obligation in the part of the United States of America, its agencies or instrumentalities, by reason of the acquisition, construction or operation of any property or works of whatever kind, to make any payment to any State or political subdivision thereof, State agency, municipality or entity whatsoever, in reimbursement for the loss of taxes;

(e) Subjecting any property of the United States of America, its agencies, or instrumentalities, to the laws of any State to an extent other than the extent to which such laws would apply without regard to this compact.

ARTICE XX

This compact may be terminated at any time by the unanimous agreement of the signatory States. In the event of such termination, all rights established under it shall continue unimpaired.

ARTICLE XXI

This compact shall become binding and obligatory when it shall have been ratified by the legislatures of each of the signatory States and approved by the Congress of the United States of America. Notice of ratification by the legislatures of the signatory States shall be given by the governor of each signatory State to the governor of the other signatory States and to the President of the United States of America, and the President is hereby requested to give notice to the governor of each of the signatory States of approval by the Congress of the United States of America.

IN WITNESS WHEREOF, the Commissioners have executed six counterparts hereof each of which shall be and constitute an original, one of which shall be deposited in the archives of the Department of State of the United States of America, and one of which shall be forwarded to the governor of each of the signatory States.

Done at the city of Santa Fe, State of New Mexico, this 11th day of October 1948.

CHARLES A. CARSON,
Commissioner for the State of Arizona.
CLIFFORD H. STONE,
Commissioner for the State of Colorado.
FRED E. WILSON,
Commissioner for the State of New Mexico.
EDWARD H. WATSON,
Commissioner for the State of Utah.
L. C. BISHOP,
Commissioner for the State of Wyoming.
GROVER A. GILES,
Secretary.

Approved:

HARRY W. BASHORE,
Representative of the United States of America.

Senator O'MAHONEY. If there is nothing else the Chair announces that the hearings will resume tomorrow morning at 10 o'clock in room 224 to hear Governor Johnson, of Colorado, former United States Senator from that State, and other Colorado witnesses.

Director Val Peterson, of Civil Defense; Mr. Barlow, a member of the Legislature of the State of Wyoming; Senator Bennett; a delegation from Utah; Mr. Angus McDonald of the National Farmers' Union; Mr. David Moffett of the Utah Power & Light Co.; Mr. Patterson of the Public Service, Colorado; Mr. Charles J. Fain, National Rural Electric Cooperatives.

The meeting stands adjourned until tomorrow morning at 10 o'clock.

(Thereupon, at 4:15 p. m., the committee was recessed, to reconvene at 10 a. m., Tuesday, March 1, 1955.)

COLORADO RIVER STORAGE PROJECT

TUESDAY, MARCH 1, 1955

UNITED STATES SENATE,
SUBCOMMITTEE ON IRRIGATION AND RECLAMATION OF THE
COMMITTEE ON INTERIOR AND INSULAR AFFAIRS,
Washington, D. C.

The subcommittee met at 10 a. m., pursuant to recess, in the committee room, 224 Senate Office Building, Senator Clinton P. Anderson (New Mexico), presiding.

Present: Senators Clinton P. Anderson (New Mexico); Joseph C. O'Mahoney (Wyoming); Eugene D. Millikin (Colorado), and Arthur V. Watkins (Utah).

Present also: Senators Alan Bible, Nevada; Thomas H. Kuchel, California; Frank A. Barrett, Wyoming; Barry Goldwater, Arizona; Gordon Allott, Colorado; and Wallace F. Bennett, Utah.

Representative at large Keith B. Thompson of Wyoming; Representative Byron G. Rogers, Colorado.

Present also: Stewart French, staff director and chief counsel; Goodrich W. Lineweaver, staff member for reclamation; William K. Coburn, staff member for public lands; James Gamble, staff member for Indian Affairs; Richard L. Callaghan, chief clerk; N. D. McSherry, assistant chief clerk.

Senator ANDERSON. In view of the fact that some members may have obligations to other committees, I thought we would try to accommodate them in order that they may get to other hearings.

Senator ANDERSON. Senator Allott, would you like to present your statement at this time?

Senator ALLOTT. Yes, I would.

STATEMENT OF HON. GORDON ALLOTT, UNITED STATES SENATOR FROM THE STATE OF COLORADO

As previously stated in open hearing, I do unqualifiedly endorse the upper Colorado River project and urge its passage by Congress. It is a necessity for the development of the West; it is a necessity for the development of the upper Colorado River Basin and the upper Colorado River States; it is a necessity if we are to meet the demands for electric power now existing within the Western States; it is a necessity if we are to have available for our national economy the future development which the next 20 years of construction will make possible; it is a necessity if there is ever going to be any justice in a division of the water of the upper States basin, and any attempt to thwart the upper Colorado River project in its development is an attempt to continue the injustice which goes on daily.

Senator ANDERSON. Senator Bennett has a hearing that is extremely important. We will be glad to accommodate you.

I know Governor Johnson would not mind that.

STATEMENT OF HON. WALLACE F. BENNETT, A UNITED STATES SENATOR FROM THE STATE OF UTAH

Senator BENNETT. Mr. Chairman, I do not intend to make an oral statement. I have written what I have to say and have tried to keep within the general pattern that I am not repeating what I said last year.

I would appreciate it if you will accept my statement for the record and excuse me.

Senator ANDERSON. Let me ask just one question: Have you in any way modified your enthusiastic support of the program?

Senator BENNETT. I think the farther I go, the older I get, the more enthusiastic I become about it and the possibilities for the future of Utah.

Senator ANDERSON. Thank you. I appreciate that very much.

Senator BENNETT. I am happy to appear before this distinguished committee to endorse and recommend wholeheartedly that the upper Colorado River storage project be authorized. With drought conditions and water shortages prevalent in much of my State of Utah, it is imperative that our water must not be wasted any longer by going unused into the Pacific Ocean.

The project is soundly conceived and it is in accord with reclamation law. It is the only method by which we can use the waters rightfully belonging to us under the Colorado compact of 1922.

Benefits entire Nation—uranium: Of course, the project will be of tremendous benefit to the upper basin States, but it will be of equal and even greater benefit to the Nation as a whole.

Ninety percent of our domestic supply of uranium is located on the Colorado Plateau.

It is of particular importance that this all-important strategic metal be developed for our atomic defense and our national safety. Water and power are needed to do it. Our uranium is a dependable source, contrary to that of our overseas supply which is subject to the whims of political machinations.

Defense metals: The mineral wealth of the area is staggering to contemplate and is of great strategic and military importance. A brief summary of the important minerals is illuminating.

1. Ninety percent of our domestic uranium is in the upper basin.
2. Utah and the upper basin are one of the most important world sources for other radioactive ores such as vanadium, carnotite, and pitchblende.
3. We have oil shale containing more oil than all of our known oil supply and reserves in the present United States.
4. One-sixth of the world's supply of coal is in the upper basin.
5. We have great deposits of magnesium.
6. All of the materials necessary for a great chemical industry are present.
7. There are great deposits of phosphate now in short supply.

8. We have great amounts of nonferrous metals of which Utah is a leading producer of copper, lead, zinc, silver, and gold, as well as iron.

Every State in the Nation has a great stake in the development of these extremely important metals and minerals.

This is particularly true when we view the unstable international situation and review recent history. Metals and minerals were in critical short supply in World War II and in the Korean war.

Sadly enough, we have learned that we cannot depend on foreign sources for these metals during time of war, and many times not even in peace. It is imperative that we develop these minerals to assure an adequate defensive posture. We must be prepared.

Industrial dispersion: It is sobering to think of the potential and real peril our domestic industry is in, even today. We need not indulge in conjuring up ghosts or play upon the fears of the public, but we must be realistic about the dangers of atomic and hydrogen bomb attack.

This is particularly true as intercontinental guided missiles become a forbidding reality. The overwhelming bulk of our productive capacity could be obliterated by a few well placed bombs or missiles, for our key industries are concentrated in just a few areas.

Industrial dispersion is no longer an idle topic. But our industries must have somewhere to disperse. Utah and the upper basin could provide such an area surrounded largely by mountains.

However, we must have the water and power to support such industries, as well as the domestic water to support additional population. The upper Colorado River project can provide them.

Utah can double her present population if we have our share of the Colorado waters. Without this water, a ceiling is placed on our growth and prosperity. We shall have to continue to export our children to other States because opportunity for them is lacking.

Civil defense: Civil defense plans and requirements enter into our consideration of the bill for it is anticipated that in the event of an enemy attack, Utah will be expected to absorb a great portion of the coastal population. If we don't have water for our present needs in some areas, it will obviously restrict our ability to meet our civil defense responsibilities in the event of such an influx. Yet our only remaining undeveloped water supply is the Colorado River.

A nonpartisan project: The project is a good one and is of great importance to the entire Nation. This is shown by the strong support given by President Eisenhower and his administration.

However, it is a nonpartisan matter, for the project enjoys the backing of both parties in Utah and the upper basin.

I was pleased to see Congressmen and Senators from many other States come into Utah in the recent congressional campaign and announce their backing of the project. The only differences I saw were the debates over which party was the better supporter of reclamation.

I believe that the Republican and Democratic platforms taking credit for past reclamation achievements and pledging greater efforts for the future are compacts with the people of our country and are not just empty phrases.

Opposition of southern California. For some time I have hoped that southern California would approach the upper Colorado project

in a constructive and objective fashion. It becomes increasingly obvious, however, that their goal is no longer just to assure that the project conforms with the Colorado River compact of 1922, but that they will not be satisfied until the entire project is destroyed.

California had "first turn" on river: Because California has had "first turn" in the development of the Colorado waters, they now have available nearly 3 times as much of the Colorado waters as the upper basin. They have, or will shortly have, 23 times as much storage. They will also have developed 53 times as much hydroelectric power from the waters of the basin.

This is more remarkable when it is considered that approximate equality of development between the upper and lower basins was contemplated under the 1922 agreement.

Moreover, by having first turn, southern California saved a billion dollars since they would have to pay that much more if Hoover, Parker, and Davis Dams and others were built today at current inflated prices which the upper basin must now pay for its project.

It is saddening to think that California would deliberately block the project. Of course, they have much to gain for the water will continue to run downstream to California.

In the meantime, they will have their water as well as ours. They can then be assured that any surplus above their needs can flow unused into the Pacific so that the upper-basin States can't use it.

The fact that this position renders the Colorado River compact, so solemnly entered into by California and other Colorado Basin States, but a worthless parchment, is apparently of little consequence.

Upper basin supports compact: As this committee pointed out in reporting the bill last year, California's rights will be protected. Of course, it is the intent of the upper-basin States to honor the compact. Provisions have been written into the bill, S. 500, to assure that disputes may be litigated if operation of the project under the law of the river is disputed.

In view of these facts, I hope that calmer heads will prevail in southern California so that we may be able to amicably settle our problems and go ahead with the project. If the present strategy to defeat it continues, then we must reluctantly assume that southern California intends to break faith with the upper basin and nullify the compact.

Echo Park Dam: I am disappointed in the conduct of conservationist leaders in their opposition to the Echo Park Dam. Their initial reaction to Echo Park prior to the 1950 Department of Interior hearings might be explained by lack of information, but their subsequent position is untenable.

To begin with, newspapers carried stories distributed by the conservationists that the dinosaur quarry would be destroyed.

The conservationists have subsequently admitted that they were wrong, but even today we in the upper-basin States are still burdened by this error.

Unfortunately, the retraction was not accompanied by press releases as was the original charge.

Not an invasion of Dinosaur Monument: Today, we, in Utah and the upper-basin States, are saddled with a more far-reaching and serious accusation which is also untrue. The conservationist leaders

charge that the Echo Park Dam is an invasion of the Dinosaur National Monument. They have made certain that this charge, too, received much publicity in the newspapers of the Nation.

When the idea of enlarging the boundaries of the Dinosaur National Monument was first presented, there was no support of any consequence at the time from national conservationist groups who now oppose the Echo Park Dam.

On the other hand, the people of Utah and Colorado worked long and hard to enlarge the monument even though it was an uphill fight.

The people of Utah had only one concern about enlarging the monument, and that was to make certain that reclamation and power sites which had been under investigation and study since 1900 be protected. Secure in the repeated assurances of the National Park Service and the Department of the Interior that the enlargement would not jeopardize subsequent reclamation development, our people in Utah worked hard to get the enlargement approved.

Monument executive order allows dams in Dinosaur: When President Franklin D. Roosevelt issued his Executive order in 1938 enlarging the monument, it was accepted by the people of Utah as a matter of course that the following language should be included, and I quote:

> * * * the administration of the monument shall be subject to the reclamation withdrawal of October 17, 1904, for the Brown's Park Reservoir site in connection with the Green River project.

The Brown's Park site and the Green River project are both within the enlarged area. The people of Utah had official confirmation that when it came time to build the needed dams that they could be built. In spite of this, conservationist leaders still say that it is an invasion.

The purpose of these hearings is to get at the facts. On the basis of the hearings held in 1954, this committee voted the present bill out unanimously except for the Senator from California. This would clearly indicate on which side the facts are.

I am sure that these hearings will confirm the earlier finding of fact.

In the light of this, I hope that the rank and file of the conservationist groups will unite with their colleagues in Utah who wholeheartedly support the project.

Utah conservationists approve Echo Park Dam: Since Utah wildlife and conservationist groups have taken it upon themselves to make an independent study of the project, they know the real facts, including the background of Dinosaur National Monument. Consequently, they support the project, although I know that they would be the first to join with national conservationist leaders if there were indeed an invasion of the monument.

I am confident that if other such groups throughout the country made a similar study that they would divorce themselves from their national leaders and support this vital dam.

To illustrate, I'd like to insert a statement by the director of the Cleveland Museum of Natural History. Statement of William E. Scheele, director, the Cleveland Museum of Natural History, 2717 Euclid Avenue, in the Cleveland Press, July 17, 1954:

> As we learned more about this country we became aware of a very deep current of feeling among the residents about the proposed Echo Park Dam. We were questioned within the park and in Vernal by many citizens who felt that since we represented the natural history museum we must be against the proposed dam.

I must admit that I had written so previously, but I must also admit that I was wrong in doing so. Seeing the country in which the canyon waters will be impounded we also saw the good that such stored waters could do to this arid, but fertile, region.

It was proven to us beyond doubt that many of the arguments that had been advanced by conservation groups opposing the dam were without basis in fact and the opposition unjustified.

The Dinosaur Monument and adjacent beauty spots will not be spoiled by this dam and its impounded waters. In fact, the development of this lake will make the area 100 times more accessible to those who would like to see it, and the water will cover only 500 feet of a dangerous canyon bottom that is more than 2,700 feet deep.

It seems as though 3 or 4 Far Western States are confusing the issue in their efforts to permit more water from the upper Colorado River to reach their own home States before it is distributed.

The effect of the position taken by conservationist leaders is to urge that the United States Government break faith with the people of Utah and the upper basin and repudiate solemn promises as well as President Roosevelt's Executive order.

Since the Echo Park Dam is obviously neither an invasion nor a precedent, the discussion about alternate sites should be centered only on selecting the best sites. Competent engineers after years of study testify that the Echo Park Dam best meets the needs of the project and the area from all points of view.

In conclusion, the project is needed to protect the safety of the United States to assure a safe source of supply of uranium and the vast storehouse of other essential defense metals. The project is essential to enable Utah and the upper basin to share in the future growth of the Nation.

Since southern California has had first turn on the river, she has enjoyed an incalculable advantage. The upper basin States have pledged to honor the compact. Southern California, as a signatory to that same compact, should, in the interest of fair play, adopt a more cooperative attitude, rather than one of obstruction.

Lastly, the cry that Echo Park Dam is an invasion of the national-park system is unfounded in fact.

I am sure that this committee will again report the project favorably to the Senate, and I hope that the Senate, relying on the judgment of this committee, will approve the project by a substantial majority.

Senator ANDERSON. Is there anyone here who has a committee assignment?

If not, we will continue the hearings with the statement from our long-time colleague and personal friend of so many of us, Governor Johnson.

Governor, we welcome you back. We are happy to have you as a witness now.

STATEMENT OF HON. EDWIN C. JOHNSON, GOVERNOR OF THE STATE OF COLORADO

Governor JOHNSON. Thank you, Mr. Chairman and members of the committee. This is a very important committee to the Western States, especially, and to the country as a whole.

A long time ago I was a member of this committee. I regret that I do not have my statement reduced to writing altogether.

I am familiar with the rules, but I just have not had an opportunity to get the job done, Mr. Chairman.

Senator ANDERSON. I am happy to say that our former colleague from Colorado, when he was presiding last year, was courteous to some of us who had not observed the rules. I guess we can take care of you on the same basis.

Governor JOHNSON. Well, that is being very generous. I apologize to you, but I am a little bit short on written material.

I have been disappointed, too, in one matter. I have some suggested amendments or, at least, some references to the language in the bill which I want to call to your attention for whatever merit it may deserve.

And in order to get a quick job of printing, Congressman Rogers volunteered to help me out by inserting my suggested amendments in the form of a bill. It went down to the Public Printer with a request that it be an expedited job, but Mr. Rogers tells me that the Public Printer has fallen down on the job and does not have the material here. It may be here before we get through, but I want to make that statement so that you will not think that I am totally disregarding the rules of this committee to have written statements before the committee.

I do, however, have one copy, Mr. Chairman, of part of my statement.

Senator ANDERSON. We are not worried about that at all, Governor Johnson. You just go right ahead.

Governor JOHNSON. I do have copies of some statistics I expect to offer and plenty of them.

Now, Mr. Chairman, I wish to make a statement concerning the 18 participating projects in Colorado which the Upper Colorado River Commission, the Colorado Water Conservation Board, and the Colorado General Assembly have recommended for inclusion by amendment in S. 500.

As this bill was introduced in the previous bill, Senate bill 1555, 83d Congress, 2d session, provision was made for only 5 participating projects in Colorado, the total cost of which was estimated by the Bureau of Reclamation at $25,635,500. And the depletion of the stream by these 5 projects was something in the neighborhood of 62,000 acre-feet annually.

Unfortunately, Colorado was unable to secure even reconnaissance reports on the units of the Cliffs-Divide project until the spring of 1954. These reports are now available and although they are not of feasibility grade, they cover the subjects in sufficient detail to enable the State to request inclusion in the bill on the same basis as similar projects in other States.

It is estimated total cost of the 18 additional participating units and projects comes to $218,175,500. The total for all these participating projects in Colorado, therefore, will amount to $244,811,000.

Inasmuch as Colorado is to receive 15.75 percent of the water allotted to the upper basin States, this sum in comparison is not out of line. The 18 projects with data concerning their costs and benefit-cost ratio and stream depletion are shown in the following table. You have the table before you.

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(The table referred to is as follows:)

Additional Colorado participating projects, Colorado River storage project

	Capacity of project reservoirs	Construction cost	Average annual stream depletion	Benefit-cost ratio
Gunnison River project units:	*Acre-feet*		*Acre-feet*	
Fruitgrowers extension	6,900	$1,783,000	5,540	2.4
Tomichi Creek	60,000	11,996,000	17,700	.6
East River	0	209,000	2,100	2.5
Ohio Creek	10,000	3,526,000	9,300	1.0
Fruitland Mesa	41,000	11,331,000	25,100	1.2
Bostwick Park	9,000	2,753,000	4,800	1.7
Grand Mesa	71,000	20,630,000	24,700	1.4
Dallas Creek	41,200	10,760,000	31,000	1.5
Total	239,100	62,988,000	120,240	
Cliffs-Divide project units:				
Parshall	43,000	12,026,100	28,600	1.0
Troublesome	20,100	5,387,700	13,000	1.2
Rabbit Ear	22,500	4,846,600	16,400	1.3
Eagle Divide	12,800	3,498,200	12,000	1.1
Woody Creek	0	184,400	1,400	3.9
West Divide	118,000	84,676,900	88,100	.9
Bluestone unit (without DeBeque)	0	3,445,600	10,900	2.0
Battlement Mesa	25,000	5,987,400	10,700	1.1
Total	241,400	120,052,900	190,100	
San Juan Dolores: Dolores	153,000	26,179,000	69,370	1.1
White-Yampa: Savery-Pot-Hook (Colorado)	65,000	8,956,000	+20,000	1.21
Total	698,500	218,175,900	399,710	

Governor JOHNSON. The first column indicates the capacity of project reservoirs in acre-feet.

The second column represents the construction costs.

The third column represents the average annual stream depletion in acre-feet.

The fourth column represents the benefit-cost ratio.

I think you are all familiar with the benefit-cost ratio.

For instance, the first project, the Fruitgrowers Extension, shows a cost ratio of 2.4. That means that the benefits in that project are 2.4 times the cost.

These projects, as you will note, are divided into four general projects:

The Gunnison River project units, consisting of eight projects.

The Cliffs-Divide project units, consisting of eight projects.

The San Juan-Dolores project, under Dolores River.

And in the White-Yampa area, the Savery-Pot Hook.

It will be noted from the last column in the table that all but two have benefit-cost ratios greater than 1.30.

The Tomichi Creek unit of the Gunnison project is below par in this respect. However, it is thought that a restudy may bring the ratio up to the desired value. The Tomichi Creek reservoir is a reservoir of very great importance in the upper Gunnison River Valley and we hope that it may prove to be up to the standard which is required.

Further surveys will have to determine that fact.

The West Divide unit of the Cliffs-Divide project occupies a most commanding position in an area which promises startling industrial development within the next decade. An inspection of the proposed project indicates alterations in the preliminary plan which in all probability raise the benefit-cost ratio considerably above 1.0 to 1.

Senator MILLIKIN. What project is that, Senator?

Governor JOHNSON. That is the West Divide unit in the Cliffs-Divide project. You will find West Divide sixth down in the second set of units.

Senator ANDERSON. From a money standpoint it represents two-thirds of all the money set forth.

Governor JOHNSON. That is right. It is an important project and, of course, from a money point of view, it represents a very large investment.

Whether that project will finally measure up or not remains for further study.

The topography of western Colorado in the basins of the Colorado and Gunnison Rivers is such that, with one exception, the possible irrigation projects are all small in size and the land involved is located in discontinuous areas. For this reason it is not possible to build 1 or 2 large structures which will store water for the use of the several potential irrigation units.

Each must have its own storage reservoir.

This viewpoint was evidently held by the Bureau of Reclamation officials when they made their studies on these two rivers because the project study in one case is known as the Gunnison River project, and in the other the study on the main stem of the Colorado River as the Cliffs-Divide project, each embracing the entire stream concerned. Each project is made up of numerous units, so really, the State of Colorado is asking for the inclusion of only 4 additional projects, rather than 18. These additional projects are portions of, first, the Gunnison River project, and, second, the Cliffs-Divide project; third, the Dolores project, and, fourth, the Savery-Pot Hook project.

The large downstream reservoirs, in addition to furnishing cyclic storage, are a means of earning money to pay for the construction in a large measure of the upstream participating projects.

It should be clear in everyone's mind that the latter, the participating projects, cannot come into existence until the small upstream reservoirs are constructed to hold back the spring runoff and, thus, afford water supplies for irrigation of the land.

Last spring in my appearance before the Senate Subcommittee on Irrigation and Reclamation of the Committee on Interior and Insular Affairs, I stated that the maximum quantity of unallocated waters available for consumptive use in Colorado was 1,347,000 acre-feet.

In the table on the previous page, you will note that the 18 units and projects suggested would deplete the several streams in a total amount of approximately 400,000 acre-feet. This is less than a third of the unallocated water available for consumptive use in Colorado.

The five participating projects mentioned in Senate bill S. 1555 and again in this bill, would deplete the streams in the amount of only 62,400 acre-feet, a total of 462,000 acre-feet for all Colorado participating projects, only a fraction of Colorado's allocation.

In summation, may I emphasize the fact that all of these additional participating units and projects are located high up on the mountain streams where the flood flows can be conserved and used for irrigation on adjacent lands. They are all necessary elements in the economy of Colorado and will contribute in a large measure to the economy of the Nation.

The Fruitgrowers Extension project and the Savery-Pot Hook project have feasibility reports which as yet have not been released by the Interior Department. All other units have reconnaissance reports which indicate that feasibility studies will show them well within the requirements set up by the Bureau of Reclamation and the Congress for such projects.

The addition of these units to the upper Colorado River storage bill places the State of Colorado in its rightful position when compared with other States of the upper basin.

Now, Mr. Chairman, before we add these projects to the bill, this is the percentage of the expenditures which will be used by each of the four upper basin States. Colorado will receive 3½ percent. I am talking about participating project only, not storage project.

Colorado, 3½ percent; Utah, 37 percent; Wyoming, 6 percent; New Mexico, 53½ percent.

After these bills are added, if they are added, and I most sincerely hope that they are and urge that they be made a part of this bill, Colorado will have 28 percent instead of 3½ percent; Utah will have 27 percent; Wyoming 5 percent, and New Mexico, 40 percent.

I don't mean to indicate that anything is to be taken away from New Mexico or Utah, but by adding Colorado the percentage becomes more balanced and that is the reason for the change in the percentage ratios between the States concerned.

Senator MILLIKIN. Would you mind repeating again, Senator, what percentage of the water from the streams originates in Colorado?

Governor JOHNSON. 72.18 percent of the upper Colorado River is produced by Colorado.

Senator MILLIKIN. How much water was allocated to the upper basin compact?

Governor JOHNSON. 51.75 was allocated to Colorado. Twenty-three percent to Utah; 14 percent to Wyoming, and 11.25 to New Mexico.

Colorado, of course, produces most of the water of the upper Colorado River. Colorado and Wyoming produce a great deal of the water in the upper Colorado.

But under the compact that has been entered into, among the upper basin States Colorado shares still 51.75. So it seems very much in point that Colorado's participating projects should be raised from the extreme low of 3½ percent to something that is more in line with the other States when it is pushed up to 28 percent.

Senator O'MAHONEY. Governor, may I ask you what is the basis of this latest percentage figure you gave? Percent of what?

Governor JOHNSON. That is the percentage of the money that is estimated will be required to build these projects in the various States.

Senator O'MAHONEY. You are not suggesting any change of the compact division of the water?

Governor JOHNSON. No, sir; that is irrevocable and fixed. The only percentage that I am talking about is the percentage of the money that Senate bill 500 is estimated to use in the building of the various projects which are included in this bill, the participating projects.

I want to say that the Savery-Pot Hook project in northern Colorado is also a Wyoming project. It irrigates land in both States and

adds supplemental water in both States. It adds more supplemental water in Wyoming than it does in Colorado, but it is included here.

There is no division made with respect to the cost of building that project as between the State of Colorado and the State of Wyoming.

Now, Mr. Chairman, if you have Senate bill 500 before you and if you will turn to page 2 of that bill, line 15, I am urging that Cross Mountain be stricken and that after "Glen Canyon," "Juniper," be added.

Now, these printed copies have come. These are the amendments which I will recommend be inserted in H. R. 4488, by Congressman Rogers.

You can find the language in each one of them that I am bringing up for your consideration.

(The bill introduced by Representative Rogers, H. R. 4488, follows:)

[H. R. 4488, 84th Cong., 1st sess.]

A BILL To authorize the Secretary of the Interior to construct, operate, and maintain the Colorado River storage project and participating projects, and for other purposes

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That, in order to initiate the comprehensive development of the water resources of the Upper Colorado River Basin, the Congress, in the exercise of its constitutional authority to provide for the general welfare, to regulate commerce among the States and with the Indian tribes, and to make all needful rules and regulations respecting property belonging to the United States, and for the purposes, among others, of regulating the flow of the Colorado River, storing water for beneficial consumptive use, making it possible for the States of the upper basin to utilize, consistently with the provisions of the Colorado River Compact, the apportionment made to and among them in the Colorado River Compact and the Upper Colorado River Basin Compact, respectively, providing for the reclamation of arid and semiarid land, for the control of floods and for the improvement of navigation, and the generation of hydroelectric power, as an incident of the foregoing purposes, hereby authorizes the Secretary of the Interior (1) to construct, operate, and maintain the following initial units of the Colorado River storage project, consisting of dams, reservoirs, powerplants, tranmission facilities and appurtenant works: Curecanti, Echo Park, Flaming Gorge, Glen Canyon, Juniper, and Navajo: *Provided*, That the Curecanti Dam shall be constructed to a height which will impound not less than nine hundred and forty thousand acre-feet of water or a reservoir of such greater capacity as may be acceptable to local interests in the vicinity of the city of Gunnison, Colo., and that construction thereof shall not be undertaken until the Secretary has, on the basis of further engineering and economic investigations, reexamined the economic justification of such unit and, accompanied by appropriate documentation in the form of a supplemental report, has certified to the Congress and to the President that, in his judgment, the benefits of such unit will exceed its costs; and (2) to construct, operate, and maintain the following additional reclamation projects (including power-generating and transmission facilities related thereto), hereinafter referred to as participating projects: Central Utah (initial phase); Cliff-Divide (consisting of eight project units), Dolores, Emery County, Elkhorn, Florida, Gooseberry, Gunnison River (consisting of eigth project units), Hammond, Kendall, La Barge, Lyman, Paonia (including the Minnesota unit, a dam and reservoir on Muddy Creek just above its confluence with the North Fork of the Gunnison River, and other necessary works), Pine River Extension, Savery-Pot Hook, Seedskadee, Silt, Smith Fork, San Juan-Chama, Navajo: *Provided*, That (a) construction of a participating project set forth in this clause (2) shall not be undertaken until the Secretary has reexamined the economic justification of such project and, accompanied by appropriate documentation in the form of a supplemental report, has certified to the Congress, through the President, that, in his judgment, the benefits of such project will exceed its costs, and that the financial reimbursability reqirements set forth in section 4 of this Act can be met. The Secretary's supplemental report for each such project shall include, among other things, (i) a reappraisal of the prospective direct agricultural benefits of the project made by the Secretary

after consultation with the Secretary of Agriculture; (ii) a reevaluation of the nondirect benefits of the project; and (iii) allocations of the total cost of construction of each participating project or separable features thereof, excluding any expenditures authorized by section 7 of this Act, to power, irrigation, municipal water supply, flood control or navigation, or any other purpose authorized under reclamation law. Section 1 (c) of the Flood Control Act of 1944 shall, except as hereinafter provided for the San Juan-Chama and the Navajo participating projects, not be applicable to such supplemental reports; and, (b) that no appopriation for or construction of the San Juan-Chama project or the Navajo participating project shall be made or begun until coordinated reports thereon shall have been submitted to the affected States, including (but without limiting the generality of the foregoing) the State of Texas, pursuant to the Act of December 22, 1944, and said projects shall have been approved and authorized by the Congress: *Provided further*, That with reference to the San Juan-Chama project, it shall be limited to a single off-stream dam and reservoir on a tributary of the Chama River to be used solely for the control and regulation of water imported from the San Juan River, that no power facilities shall be established, installed, or operated along the diversion or on the reservoir or dam, and such dam and reservoir shall at all times be operated by the Bureau of Reclamation of the Department of the Interior in strict compliance with the Rio Grande Compact as administered by the Rio Grande Compact Commission.

SEC. 2. In order to achieve such comprehensive development as will assure the consumptive use in the States of the Upper Colorado River Basin of waters of the Colorado River system the use of which is apportioned to the Upper Colorado River Basin by the Colorado River Compact and to each State thereof by the Upper Colorado River Basin Compact, it is the intent of the Congress in the future to authorize the construction, operation, and maintenance of further units of the Colorado River storage project, of additional phases of participating projects authorized in this Act, and of new participating projects as additional information becomes available and additional needs are indicated. It is hereby declared to be the purpose of the Congress to authorize as participating projects only projects (including units or phases thereof)—

(1) for the use, in one or more of the States designated in article III of the Upper Colorado River Basin Compact, of waters of the Upper Colorado River system the consumptive use of which is apportioned to those States by that article; and

(2) for which pertinent data sufficient to determine their probable engineering and economic justification and feasibility shall be available. It is likewise declared to be the policy of the Congress that the costs of any participating project authorized herein or in the future shall be amortized from its own revenues to the fullest extent consistent with the provisions of this Act and Federal reclamation law. Furthermore, participating projects authorized in the future shall be on a full equality with participating projects authorized herein with respect to all considerations including economic justification, appraisal of agricultural and other benefits, irrigation repayment contracts and obligations, interest charges, financial reimbursability requirements and payment, allocation of costs of construction to power, irrigation, municipal water supply, flood control and any other purpose or benefit authorized under reclamation law.

SEC. 3. Except as otherwise provided in this Act, in constructing, operating, and maintaining the units of the Colorado River storage project and the participating projects listed in section 1 of this Act, the Secretary shall be governed by the Federal reclamation laws (Act of June 17, 1902, 32 Stat. 388, and Acts amendatory thereof or supplementary thereto): *Provided*, That (a) contracts shall be entered into which (except as otherwise provided for the Paonia and Eden projects) provide for repayment of the irrigation obligation assumed thereunder with respect to any project contract unit over a period of not more than fifty years exclusive of any development period authorized by law; (b) prior to construction of irrigation distribution facilities, repayment contracts shall be made with an "organization" as defined in paragraph 2 (g) of the Reclamation Project Act of 1939 (53 Stat. 1187) which has the capacity to levy assessments upon all taxable real property located within its boundaries to assist in making repayments, except where a substantial proportion of the lands to be served are owned by the United States; (c) contracts relating to municipal water supply may be made without regard to the limitations of the last sentence of section 9 (c) of the Reclamation Project Act of 1939; and (d), as to Indian lands within, under or served by any participating project, payment of construction costs

within the capability of the land to repay shall be subject to the Act of July 1, 1932 (47 Stat. 564). All units and participating projects shall be subject to the apportionments of the use of water between the upper and lower basins of the Colorado River and among the States of the upper basin fixed in the Colorado River Compact and the Upper Colorado River Basin Compact, respectively, and to the terms of the treaty with the United Mexican States) (Treaty Series 994).

SEC. 4. (a) There is hereby authorized a separate fund in the Treasury of the United States to be known as the Upper Colorado River Basin Fund (hereinafter referred to as the Basin Fund), which shall remain available until expended, as hereafter provided, for carrying out provisions of this Act other than section 7.

(b) All appropriations made for the purpose of carrying out the provisions of this Act, other than section 7, shall be credited to the Basin Fund as advances from the general fund of the Treasury, and such funds shall be available for expenditures within the limitations of the provisions of this act and of the provisions of the appropriations.

(c) All revenues collected in connection with the operation of the Colorado River storage project and participating projects shall be credited to the Basin Fund, and shall be available, without further appropriation, for (1) defraying the costs of operation, maintenance, and replacements of and emergency expenditures for, all facilities of the Colorado River storage project and participating projects, within such separate limitations as may be included in annual appropriation acts, (2) payment as required by subsection (d) of this section, (3) payment of the reimbursable construction costs of the Paonia project which are beyond the ability of the water users to repay within the period prescribed in the Act of June 25, 1947 (61 Stat. 181), said payment to be made within fifty years after completion of that portion of the project which has not been constructed as of the date of this Act, (4) payment in connection with the irrigation features of the Eden project as specified in the Act of June 28, 1949 (63 Stat. 277); and (5) any remaining surplus to be available only for appropriation for construction of the units and participating projects authorized by or pursuant to this act.

(d) Revenues in the Basin Fund in excess of operating needs shall be paid annually to the general fund of the Treasury to the extent required to return for that year—

(1) the costs of each unit, participating project, or any separable feature thereof which are allocated to power pursuant to section 5 of this Act, within a period not exceeding fifty years from the date of completion of such unit, participating project, or separable feature thereof;

(2) the costs of each unit, participating project, or any separable feature thereof which are allocated to irrigation pursuant to section 5 of this Act of this Act, within a period not exceeding fifty years from the date of completion of such unit, participating project, or separable feature thereof;

(3) interest on the unamortized balance of the investment (including interest during construction) in the power and municipal water supply features of each unit, participating project, or any separable feature thereof, at a rate determined by the Secretary of the Treasury as provided in subsection (e), and interest due shall be a first charge; and

(4) the costs of each unit, participating project, or any separable feature thereof which are allocated to irrigation pursuant to section 5 of this Act within a period not exceeding fifty years, in addition to any development period authorized by law, from the date of completion of such unit, participating project, or separable feature thereof, or, in the cases of the Paonia project and of the Indian lands, within a period consistent with other provisions of law applicable thereto.

(e) The interest rate applicable to each unit of the storage project and each participating project shall be determined by the Secretary of the Treasury as of the time the first advance is made for initating construction of said unit or project. Such interest rate shall be determined by calculating the average yield to maturity on the basis of daily closing market bid quotations during the month of June next preceding the fiscal year in which said advance is made, on all interest-bearing marketable public debt obligations of the United States having a maturity date of fifteen or more years from the first day of said month, and by adjusting such average annual yield to the nearest one-eighth of 1 per centum.

(f) Business-type budgets shall be submitted to the Congress annually for all operations financed by the Basin Fund.

SEC. 5. Upon completion of each unit, participating project, or separable feature thereof the Secretary shall allocate the total costs (excluding any expenditures authorized by section 7 of this Act) of constructing said unit, project or feature to power, irrigation, municipal water supply, flood control, navigation, or any other purposes authorized under reclamation law. Allocations of construction, operation, and maintenance costs to authorized nonreimbursable purposes shall be nonreturnable under the provisions of this Act. On January 1 of each year the Secretary shall report to the Congress for the previous fiscal year, beginning with the fiscal year 1955, upon the status of the revenues from and the cost of constructing, operating, and maintaining the Colorado River storage project and the participating projects. The Secretary's report shall be prepared to reflect accurately the Federal investment allocated at that time to power, to irrigation, and to other purposes, the progress of return and repayment thereon, and the estimated rate of progress, year by year, in accomplishing full repayment.

SEC. 6. The hydroelectric powerplants and transmission facilities authorized by this Act to be constructed, operated, and maintained by the Secretary shall be operated in conjunction with other Federal powerplants, present and potential, so as to produce the greatest practicable amount of power and energy that can be sold at firm power and energy rates, but no exercise of the authority hereby granted shall affect or interfere with the operation of any provision of the Colorado River Compact, the Upper Colorado River Basin Compact, or the Boulder Canyon Project Act: *Provided*, That power produced pursuant to this Act shall be sold at the highest practicable price to enhance the development of the Upper Colorado River Basin and operation in conjunction with other powerplants shall not deprive the Basin Fund of revenues which it would receive in the absence of such joined operation.

SEC. 7. In connection with the development of the Colorado River storage project and of the participating projects, the Secretary is authorized and directed to investigate, plan, construct, operate, and maintain (1) public recreational facilities on lands withdrawn or acquired for the development of said project or of said participating projects, to conserve the scenery, the natural, historic, and archeologic objects, and the wildlife on said lands, and to provide for public use and enjoyment of the same and of the water areas created by these projects by such means as are consistent with the primary purposes of said projects; and (2) faciilties to mitigate losses of and improve conditions for the propagation of fish and wildlife. The Secretary is authorized to acquire lands and to withdraw public lands from entry or other disposition under the public land laws necessary for the construction, operation, and maintenance of the facilities herein provided, and to dispose of them to Federal, State, and local governmental agencies by lease, transfer, exchange, or conveyance upon such terms and conditions as will best promote their development and operation in the public interest, and with due regard for any change in use that may occur at some future time. All costs incurred pursuant to this section shall be nonreimbursable and nonreturnable.

SEC. 8. Nothing contained in this Act shall be construed to alter, amend, repeal, construe, interpret, modify, or be in conflict with any provision of the Boulder Canyon Project Act (45 Stat. 1057), the Boulder Canyon Project Adjustment Act (54 Stat. 774), the Colorado River Compact, the Upper Colorado River Basin Compact, the Rio Grande Compact of 1938, or the Treaty With the United Mexican States (Treaty Series 994).

SEC. 9. Expenditures for the Curecanti, Echo Park, Flaming Gorge, Glen Canyon, Juniper, and Navajo initial units of the Colorado River storage project may be made without regard to the soil survey and land classification requirements of the Interior Department Appropriation Act, 1954.

SEC. 10. There are hereby authorized to be appropriated such sums as may be required to carry out the purposes of this Act.

SEC. 11. The appropriate agencies of the United States are authorized to convey to the city and county of Denver, Colorado,, for use as a part of its municipally owned water system, such interests in lands and water rights used or acquired by the United States solely for the generation of power and other property of the United States as shall be required in connection with the development or use of its Blue River project, upon payment by Denver for any such interest of the value thereof at the time of its acquisition by Denver, and provided that any such transfer shall be so limited as not to preclude the use of the property other than water rights for the necessary functions of the United States Government.

SEC. 12. In the operation and maintenance of all facilities, authorized by Federal law and under the jurisdiction and supervision of the Secretary of the Interior, in the basin of the Colorado River, the Secretary of the Interior is directed to comply with the applicable provisions of the Colorado River Compact, the Upper Colorado River Basin Compact, the Boulder Canyon Project Act, the Boulder Canyon Project Adjustment Act, and the Treaty with the United Mexican States, in the storage and release of water from reservoirs in the Colorado River Basin. In the event of the failure of the Secretary of the Interior to so comply, any State of the Colorado River Basin may maintain an action in the Supreme Court of the United States to enforce the provisions of this section, and consent is given to the joinder of the United States as a party in such suit or suits. No agency or official of the United States shall seek or accept a right to impound or use water for the generation of power or energy, created or established by the building, operation, or use of any of the powerplants authorized by this Act.

SEC. 13. As used in this Act—

The terms "Colorado River Basin", "Colorado River Compact", "Colorado River System", "Lee Ferry", "States of the Upper Division", "upper basin", and "domestic use" shall have the meaning ascribed to them in article II of the Upper Colorado River Basin Compact.

The term "States of the Upper Colorado River Basin" shall mean the States of Arizona, Colorado, New Mexico, Utah, and Wyoming;

The term "Upper Colorado River Basin" shall have the same meaning as the term "upper basin";

The term "Upper Colorado River Basin Compact" shall mean that certain compact executed on October 11, 1948, by commissioners representing the States of Arizona, Colorado, New Mexico, Utah, and Wyoming, and consented to by the Congress of the United States of America by Act of April 6, 1949 (63 Stat. 31);

The term "Rio Grande Compact" shall mean that certain compact executed on March 18, 1938, by commissioners representing the States of Colorado, New Mexico, and Texas and consented to by the Congress of the United States of America by Act of May 31, 1939 (53 Stat. 785); and

The term "treaty with the United Mexican States" shall mean that certain treaty between the United States of America and the United Mexican States signed at Washington, District of Columbia, February 3, 1944, relating to the utilization of the waters of the Colorado River and other rivers, as amended and supplemented by the protocol dated November 14, 1944, and the understandings recited in the Senate resolution of April 18, 1945, advising and consenting to ratification thereof.

Governor JOHNSON. I want to say that I got some of my early training under Governor Adams of Colorado, who saw 50 years of public service, most of it in the Colorado Senate. I was his secretary at one time, and while Governor Adams was not an attorney, he rendered a great service to Colorado by studying every bill that came before the general assembly with great patience and thoroughness. He would go over every bill line by line and word by word and try to find anything that wasn't clear or that might, in his opinion, not be good policy.

I have attempted to do that same thing for this bill. You will note on page 2, line 19 in the bill, in the proviso, I have suggested that in line 19 that "will create" be stricken out.

Senator MILLIKIN. What bill are you referring to, Governor?

Governor JOHNSON. I am talking about Senate bill 500. This is an amendment to Curecanti.

That the words "will create" be stricken out on line 19, so that it will read—

forty thousand acre-feet of water or reservoir of such greater capacity as may be acceptable to local interests in the vicinity of the city of Gunnison, Colorado.

Then drop down to line 22—

and that construction thereof shall not be undertaken until the Secretary has, on the basis of further engineering and economic investigations, reexamined the

economic justification of such unit and, accompanied by appropriate documentation.

and so on.

In the Rogers bill that will be found on lines 17, 18, and 19, on page 2. That amendment which I have suggested gives a little more leeway to work out the problems of the Curecanti project at Gunnison.

As you know, the people of Gunnison have objected to the large Curecanti, so-called, inasmuch as at low-water time it would leave a lot of muddy flats in the area of the city of Gunnison.

This amendment which I have offered is expected to make the project when it is finally agreed upon, acceptable to Gunnison County and the town of Gunnison.

On page 5, on line 19, there is a typographical mistake. I suppose you have found it. It says "for the use in one of more" and it means "for the use in one or more". "Of" is changed to "or".

In the same section, section 2, on page 6, line 3, it reads, "Any participating project authorized in the future".

I have inserted "herein or in the future".

I am sorry I have not had time to mark these proposed amendments out on the Rogers bill.

Now, the object of that amendment is to make the participating projects which are to be approved in the future, according to the same standards as the participating projects which are approved in this bill.

We have a great many potential participating projects in the State of Colorado in addition to the 18 which have been suggested.

When the upper basin is finally developed, all of these participating projects will most certainly be improved and be developed.

But we do not want—it does not seem to me that it would be wise to enact a bill today having one standard and one standard for the participating projects that are provided for in this bill, in section 1 of this bill, and then to have a different standard apply to the projects that are to come in the future.

So I have suggested in line 3 "participating projects authorized herein or in the future". And you will find that same language in the Rogers bill on page 6, line 6, beginning at line 6. You will find that language which I want to read into the bill after "reclamation law". It reads as follows:

Furthermore, participating projects authorized in the future shall be on a full equility with participating projects authorized herein with respect to all considerations including economic justification, appraisal of agricultural and other benefits, irrigation repayment contracts and obligations, interest charges, financial reimbursability requirements and payment, allocation of costs of construction to power, irrigation, municipal water supply, flood control, and any other purpose or benefit authorized under reclamation law.

You will find that language printed in the Rogers bill on page 6, beginning with line 6, and ending on line 15.

It seems to me that that proposed amendment ought to have serious consideration by this committee.

Now, on page 7 of the bill, first, we go now to section 4. I have read section 4 over very carefully a good many times. While I have not had an opportunity of discussing section 4 with a water attorney, it seems to me that there is something missing in section 4.

Now, perhaps I am mistaken. I have been mistaken a good many times, but I have read it over carefully and it just seems to me that there is something that needs to be added to section 4. For instance, turn to paragraph (b) of section 5, on line 21, page 7.

May I say that the purpose of section 4 is to set up a separate fund in the Treasury of the United States which may be known as the upper Colorado River Basin fund. And that is a very important step to be taken.

Now, on line 21 (b) it says that:

(b) All appropriations made for the purpose of carrying out the provisions of this act, other than section 7, shall be credited to the basin fund as advances from the general fund of the Treasury.

Now, that does not say part of the appropriations; that says all of the appropriations, all of the appropriations that are made for the purpose of carrying out the provisions of this bill shall go into this fund.

But I cannot find any place in section 4, or any other part of the bill, that provides for the use of the appropriations which are made to carry out the objectives of this bill. I cannot find where there is any provision at all made for such appropriations to come out of the bill for construction purposes.

Senator ANDERSON. I do not follow you there.

Governor JOHNSON. You put money in the fund. You have a basin fund and you put money into that fund. (b) says:

All appropriations made for the purpose of carrying out the provisions of this act, other than section 7, shall be credited to the basin fund as advances from the general fund of the Treasury.

Now, would you think that if all appropriations which are made have to go into that fund there ought to be some place for the funds to come back out for construction.

Senator ANDERSON. Other than section 7?

Governor JOHNSON. Other than section 7, which is a recreation section.

Senator O'MAHONEY. What is the meaning of the conclusion of that sentence beginning with the word "and" after the word "Treasury" in line 8?

and such funds shall be available for expenditures within the limitation of the provisions of this act and the provisions of the appropriation

Governor JOHNSON. That is the language which I propose to be added.

Senator O'MAHONEY. I was reading from the Rogers bill.

Governor JOHNSON. Yes. The purpose of that is to make the appropriations available for expenditures within the limitations of the provisions of this act, Senate bill 500, and of the appropriation bill.

Senator WATKINS. Does it not seem to you that it is implicit in the statement:

All appropriations made for the purpose of carrying out the provisions of this act, other than section 7, shall be credited to the basin fund?

The appropriations for carrying out this act, and appropriations can be used from the basin fund, it seems to me that is implicit?

Governor JOHNSON. You don't say so.

Senator WATKINS. Well, you do not spell out every power in minute language.

Governor JOHNSON. It says:

All appropriations made for the purpose of carrying out the provisions of this act shall be credited to the basin fund as advances from the general fund to the Treasury.

Then you go on with the rest of the bill and you make your provisions for taking money out of the basin fund and after you take the money out for the purposes that are set up in the bill, then the rest of the money goes back into the Treasury.

Senator WATKINS. One of the purposes is the construction of these projects.

Governor JOHNSON. That is right.

Senator WATKINS. For the purpose of carrying out the provisions of this act.

Governor JOHNSON. That is right.

Of course, all appropriations go in here.

Senator WATKINS. To me it seems to say so in very plain language that the money is available for the purpose of this act even though it is in that fund.

But if there is any doubt in anybody's mind, if we have to put in 3 or 4 words to get it out of that fund, I am for it.

Senator ANDERSON. Does not section (a) take it out:

There is hereby authorized a separate fund in the Treasury of the United States to be known as the Upper Colorado River Basin (hereinafter referred to as the basin fund), which shall remain available until expended, as hereafter provided, for carrying out provisions of this act other than section 7.

So whatever is done, to build dams or anything else, is taken out of the basin fund.

Governor JOHNSON. I cannot see it the way you do, but I cannot argue the matter with you. The money goes into that fund and it remains in that fund——

Senator ANDERSON. Until it is expended for the purposes of the act.

Governor JOHNSON. If you stop right there that might be all right, but you go on with all of these provisions on pages 8 and 9 and 10 and 11, and you list the expenditures from this fund in detail and there is nothing in any of them that says anything about construction cost.

Senator ANDERSON. Except section (a).

Governor JOHNSON. Which doesn't say anything about it. It says:

There is hereby authorized a separate fund in the Treasury of the United States to be known as the Upper Colorado River Basin fund which shall remain available until expended as hereafter provided.

Now, "hereafter provided" means (b), (c), (d), and all these other arrangements that go clear to page 11, line 11.

Can you find any place in that bill where any money can be expended for construction? It has everything else in there, but not for construction.

Then down here on page 8, line 17, it says:

Provided, That revenues created to the basin fund shall not be available for appropriation for construction of the units and participating projects authorized by or pursuant to this Act.

Now, I would like to know what that language may mean.

Senator O'MAHONEY. Where is that language?

Governor JOHNSON. On page 8, line 17, proviso.

Senator ANDERSON. Do you recognize the difference between revenues and appropriations?

Governor JOHNSON. Well, I think an appropriation becomes revenues after it goes in the fund. I think it is an appropriation until after it gets in the fund and then after that it becomes a revenue.

Senator MILLIKIN. Could that not be cleared up with some language?

Governor JOHNSON. Yes.

Senator MILLIKIN. I suggest that it be done.

Governor JOHNSON. All I am doing is calling attention to it. I have prepared language which may not be appropriate.

On the other hand, it may be appropriate.

Senator O'MAHONEY. Governor, I think there is a difference in the meaning of revenues and appropriations. If you look on page 7, beginning with line 21, it says specifically:

All appropriations made for the purpose of carrying out the provisions of this Act.

Now, the provisions of the act include construction.

Governor JOHNSON. That describes the appropriation.

Senator O'MAHONEY. Then this other provides that revenue—the word "revenue" does not include appropriations.

Governor JOHNSON. It does after they get into the fund, they become revenues.

Senator O'MAHONEY. No; appropriations are one thing; revenues are another. Revenues arise from the sale of power, for example.

Then on line 24:

The cost of each unit, participating project, or any separable feature.

I do not believe there was any intention on the part of anybody drafting this bill to make the distinction that you point out. I am sure that nobody on the committee would hesitate to clarify the matter.

Governor JOHNSON. All I am doing it for, Senator, and I am sure you know that, is to be helpful and constructive. I tell you why I was so anxious about it. I was anxious to know whether the funds that were appropriated could be used for the building of participating projects, and especially whether the funds that were earned by the projects could be used for the building of participating projects in the upper Colorado River Basin.

When I read section 4 I was surprised to find that you can take the money out of the basin fund for any number of purposes except construction. And there is no way of taking any money out of that fund for construction. At least it is not written out here.

Senator MILLIKIN. Mr. Chairman, I think the Senator has brought up a very important point. On that there ought not to be the slightest possibility of argument.

Therefore, I suggest that the committee agree that that should be clarified so that there cannot be any question about it.

Senator WATKINS. Mr. Chairman, there will be a number of matters in connection with the draftsmanship of the bill. I take it they will be considered by the committee when it comes time to mark up the bill and that suggestion will be considered at the same time.

To me it means that the money can be taken out, but if there is any doubt in anybody's mind I would not go through all the pains of getting the bill passed and find out we cannot spend the money.

Senator MILLIKIN. It will take only a few words to clarify it and I suggest we clarify it.

Governor JOHNSON. I thank my former colleague.

Senator ANDERSON. I want to call Governor Johnson's attention to the fact that this is set up precisely as the Colorado River Dam fund was set up, the same general language of putting money in the fund, and there have been expenditures from that fund in his State and other States. That was the intention of this.

Governor JOHNSON. I am sure that that was the intention.

Senator ANDERSON. The same happened on the Bonneville Dam and the expense money on the Bonneville Dam.

Governor JOHNSON. I am positive that that is the intention.

Now, in section 6, I think this is a typographical change on line 12, "the hydroelectic powerplants and transmission facilities," "and transmission facilities" were left out at that particular point.

In other places in the bill it occurs. That is on page 11, "the hydroelectric powerplants." Other places in the bill whenever you say "the hydroelectric powerplants" you add "and transmission facilities" but in this the "and transmission facilities" is left out.

Senator ANDERSON. Perhaps it is due to the fact that transmission facilities do not generate any power and this is dealing only with generation of power in such ways as will be most useful.

Governor JOHNSON. If it is operated and maintained, then your transmission facilities are needed at that time.

On page 11, line 21, I added a proviso there. You will find on the Rogers bill on page 12, line 9;

Provided, That power produced pursuant to this Act shall be sold at the highest practicable price to enhance the development of the Upper Colorado River Basin and operation in conjunction with other powerplants shall not deprive the basin fund of revenues which it would receive in the absence of such joined operations.

Section 6 deals with cooperation with other powerplants on the river and the proviso which I have offered I would like to have you give what consideration it merits.

As I say, you will find the language of it on page 12, line 9.

On page 12 of the bill I inserted an amendment, line 17. Following "interest" change the period to a comma and add "and with due regard for any change in use that may occur at some future time."

That is on the exchange of land and is meant to provide for a recovery of land that might be disposed of.

Now, section 12 on page 14, beginning with line 14, the bill says:

No right to impound or use water for the generation of power or energy, created or established by the building, operation or use of any of the powerplants authorized by this Act, shall be deemed to have priority over or otherwise operate to preclude or impair any use, regardless of the date of origin of such use, of the waters of the Colorado River and its tributaries for domestic or agricultural purposes within any of the states of the upper Colorado River Basin.

I think the last part of that proviso beginning on line 17 is in conflict with the Boulder Canyon Project Act and the seven-State compact.

In article 4 of that compact there is a proviso (c) that says:

That the provisions of this article shall not apply to or interfere with the regulation and control by any State within its boundaries of the appropriation, use, and distribution of water.

It seems to me that that proviso there on page 14 interferes with paragraph (c) of article 4 of the compact and in the first part on page 14 you state that this bill S. 500 complies with the Colorado River compact and the Boulder Canyon Project Act and so on.

So I am proposing that the language be changed which will give the same effect, but which will not fly in the face of the seven-State compact.

After the word "no" in line 14 of page 14, I suggest that you add this language:

No agency or official of the United States shall seek or accept a right to impound or use water for the generation of power or energy, created or established by the building, operation, or use of any of the powerplants authorized by this Act.

Senator O'MAHONEY. Will you read that again, please.

Governor JOHNSON. You will find that on page 15 of the Rogers bill, lines 9 to 13.

Article 4 of the compact makes a distinction between powerplants used for storage which are interstate and those which are used intrastate.

(b) Provides for your interstate.

Senator WATKINS. Where are you reading?

Governor JOHNSON. Do you want the place in the bill? Do you have the Rogers bill, Senator?

Senator WATKINS. Yes.

Governor JOHNSON. Now, look at lines 9 to 13 on page 15. Article 4 of the compact is divided into three paragraphs, (a), (b), and (c); (b) has to do with the power rights on interstate reservoirs; (c) has to do only with intrastate projects.

Now, I might give you a good example of what I am talking about. In Colorado we have the Green Mountain Reservoir. The Green Mountain Reservoir is completely an intrastate power project. The Interior Department, the Reclamation Bureau through an agent, filed on the power rights on the Green Mountain Reservoir. That is an intrastate reservoir in every way and they had a right to do that.

I do not think that this proviso on page 14, beginning with line 14, as it is written here, will stand up against paragraph (c). I am just calling your attention to what I think is very important, that you ought to take a pretty good look at that and see whether it does the job that it is supposed to do in connection with paragraph (c) of article 4 of the compact.

Senator KUCHEL. How do you interpret the language in S. 500 beginning at line 14 on page 14? What do you think that language attempts or purports to accomplish?

Governor JOHNSON. I think its intent is clear enough, but I do not think it can fly in the face of the seven-State compact.

You say right up there on top of page 14 that:

The Secretary of the Interior is directed to comply with the applicable provisions of the Colorado River compact, Boulder Canyon Project Act, the Boulder Canyon Project Adjustment Act—

and so on.

Yet you go down here and you fly right in the face of paragraph (c) and make a provision that I do not think does comply because paragraph (c) says:

The provisions of this article shall not apply to or interfere with the regulations and control of any State within its boundaries, of the appropriation, use, and distribution of water.

On an interstate reservoir I am very sure that the Department of Interior and the reclamation people can file on reservoir rights.

Senator O'MAHONEY. May I interrupt you at this point?

Governor JOHNSON. Yes.

Senator O'MAHONEY. I am calling your attention now to page 15 of the Rogers bill, the new language that you are proposing for the language beginning on line 14, of page 14, of S. 500.

Governor JOHNSON. Yes.

Senator O'MAHONEY. I want to be sure that I understand what you believe this new language to mean. It says:

No agency or official of the United States shall seek or accept a right to impound or use water for the generation of power or energy, created or established by the building, operation, or use of any of the power plants authorized by this Act.

Now, I take it that those words beginning in line 11 "by the building, operation or use of any of the powerplants authorized by this Act," are intended to convey the meaning that you believe that any agency or official of the United States properly authorized to do so may build, may operate and may use any of the powerplants authorized in the act?

Governor JOHNSON. Yes, that is right.

Senator O'MAHONEY. You do not intend to deny that?

Governor JOHNSON. I do not intend to deny that at all.

Senator O'MAHONEY. You are merely trying to deny impounding or using water for the exclusive purpose of filing?

Governor JOHNSON. No, what I am trying to do is what the Interior Department is permitted to do under the seven-State compact, to do what the Interior Department did do in Green Mountain Reservoir. They went in there and filed on the power rights. They had a right to do it.

Senator O'MAHONEY. They had or had not a right to do it?

Governor JOHNSON. They did have a right, because they were given that right by the seven-State compact, article 4, because the Green Mountain Reservoir is an intrasate reservoir and because it was an intrastate reservoir, under paragraph (c) they had a right to go in there and file on the power rights, and they did file.

And there is a lawsuit pending because they did file, now.

I do not think you can do what you say you want to do here in the rest of the language.

Senator O'MAHONEY. I am trying to find out what you want to do.

Governor JOHNSON. I don't want them to file on the power. I don't want the Federal Government to file on the power in any of the reservoirs in this development plan.

I don't want them to do that.

Senator O'MAHONEY. You do not believe that the Colorado River compact is not an interstate compact, do you?

Governor JOHNSON. Well, some of the projects are not interstate. The Green Mountain Reservoir is not interstate.

Senator ANDERSON. How do you make that distinction, just because it is within a State?

Governor JOHNSON. It is within a State and all the uses of the water which it impounds is within the State.

Senator ANDERSON. Is not it part of an interstate stream?

Governor JOHNSON. That is right. It is part of an interstate stream.

Senator O'MAHONEY. Now, we have created an interstate system, have we not? Congress has done that over a period of more than 30 years now, dating from 1922. The whole purpose of the compact was to create an interstate agreement whereby the waters of the Colorado River Basin could be utilized in 2 segments, 1 segment for the lower basin and 1 segment for the upper basin.

Governor JOHNSON. But the compact has been very careful to state that it was not interfering with the States appropriation of water or the use of its water, its allocation; it did not go into that matter at all.

Senator O'MAHONEY. I think we may be just talking about words. I understand your intent to be like that of the rest, to make the best possible division in fairness and in accordance with the terms of the compact of the waters of the whole system among those States involved.

Governor JOHNSON. And I do not want any State to be able to file on the power rights on any intrastate reservoir. That is what I am talking about.

I do not believe you can do what you are attempting to do.

Senator O'MAHONEY. You said no State. You meant no agency?

Governor JOHNSON. I meant no official of the United States; that is what I mean.

Senator KUCHEL. Governor, if I may interrupt you, what your fear is of the present language of the bill S. 500 is that you might create a right on the part of the Federal Government to file on power in connection with an intrastate dam, and to that extent interfere or deny your State the right to use those waters for its own beneficial use; is not that it?

Governor JOHNSON. That is right; and to get a power right in a reservoir just as the Federal Government claims to have a power right by filing on the power in the Green Mountain Reservoir.

Senator MILLIKIN. Governor Johnson, is the following language of article 4 of the compact that to which you are referring?

(b) Subject to the provisions of this compact, water of the Colorado River system may be impounded and used in the generation of electric power, but such impounding and use shall be subservient to the use and consumption of such water for agricultural and domestic purposes and shall not interfere with or prevent use for such dominant purposes.

Is your point the way the bill is drawn that there is a conflict between that part of article 4 and the way the bill talks?

Governor JOHNSON. No; there is no conflict with paragraph (b). But there is a conflict with the next paragraph, (c), which says: "The provisions of this article"—that means article 4—

shall not apply to or interfere with the regulation and control by any State within its boundaries of the appropriation, use, and distribution of water.

Senator ANDERSON. Does that not deal only with compliance with the State law in the acquisition of rights to use water?

Governor JOHNSON. No; I don't think so. I think it applies to intrastate reservoirs.

Senator ANDERSON. How can it be an intrastate reservoir on an interstate stream once the stream has been taken into an interstate system?

Governor JOHNSON. Because paragraph (c) gives it that right.

Senator ANDERSON. This gives it the right to have an intrastate reservoir?

Governor JOHNSON. Well, it evidently takes that possibility into consideration because it says:

> The provisions of this article shall not apply to or interfere with the regulations and control by any State within its boundaries of the appropriation, use, and distribution of water.

And yet the Federal Government or an agent of the Reclamation Bureau filed on the power rights in Green Mountain Dam because that was an intrastate reservoir.

Senator ANDERSON. We have a whole list of projects up there. Some of them are inside the States. That does not make them intrastate projects; does it?

Governor JOHNSON. I think it would if all the use of the water that they impounded was to be used within the State because the compact itself——

Senator ANDERSON. The Eden project is all within the State of Wyoming. Is that an intrastate project?

Governor JOHNSON. It is if all the waters that are impounded are used in the State of Wyoming.

Senator ANDERSON. And the Seedskadee project is also within the State. All the water is within the State of Wyoming.

Governor JOHNSON. I don't know whether all the waters that it impounds are used in Wyoming, but if that is so, I think it would come under the description of paragraph (c) in article 4.

Senator O'MAHONEY. Assuming that a certain project for irrigation and reclamation, that is to say, for agricultural use, could not be built by the State within the borders of which the possibility exists, there would be a logical possibility; suppose the water could be irrigated only through the reclamation law and by the appropriation of Federal money, and suppose that Federal money were expended to build such a reservoir and that the land to be irrigated could not possibly be paid for unless you had power revenues, would you say by the argument that you are making here that that reservoir could not be built; that that power could not be used, and therefore, that the water could not be put upon any land for reclamation?

Governor JOHNSON. Well, I would like to have you use the Green Mountain Reservoir.

Senator O'MAHONEY. I do not know anything about the Green Mountain Reservoir.

Governor JOHNSON. The Green Mountain Reservoir is a compensating reservoir that was built in connection with the Big Thompson. It is a compensating reservoir. It provides water for agricultural uses and for other industrial uses in the State of Colorado, including the development of oil shale and so on.

Senator O'MAHONEY. Is not that power developed by the construction for which the Federal Government made appropriation?

Governor JOHNSON. The Federal Government made the appropriation and built that. And filed on the power.

Senator O'MAHONEY. Then do you say to this committee that the Federal Government was wrong in filing on that power?

Governor JOHNSON. No, sir; I do not say it was wrong in filing on that power.

Senator O'MAHONEY. Do you say that that power use is subservient to agricultural uses on the west slope of Colorado?

Governor JOHNSON. I don't say that because I don't know.

Senator O'MAHONEY. Would not you have to say that if you continue the argument?

Governor JOHNSON. No, I wouldn't have to say that because I just don't know.

I know that they filed on that power.

Let me ask you a question. Why do you have this proviso in here at all?

Senator WATKINS. The one you are objecting to?

Governor JOHNSON. I am not objecting to it. I am trying to make it in harmony with the 7-State compact, but beginning on line 14, down to line 22, why do you have that provision there?

Senator O'MAHONEY. I had nothing to do, Governor, with the drawing of this bill, but I assume on reading this, without having had a chance to talk with the engineers with respect to the meaning of this precise language, I assume that it is intended to protect upstate water users.

Governor JOHNSON. Exactly. That is exactly what it was put in there for.

Senator O'MAHONEY. I think we are just debating about words and not about substance.

Governor JOHNSON. No.

Senator WATKINS. May I ask you a question about your interpretation of the language you propose, and I will read it again:

> No agency or official of the United States shall seek or accept the right to impound or use water for the generation of power or energy created or established by the building, operation or use of any of the powerplants authorized by this act.

With respect to Glen Canyon, what is your interpretation with respect to that project?

Governor JOHNSON. Glen Canyon is an intrastate reservoir.

Senator WATKINS. But it is one being built under this act.

Governor JOHNSON. Sure it is being built, but you do not want Uncle Sam to go in there and file on that power in Glen Canyon.

Senator WATKINS. He files on the power in behalf of the project as a trustee for the project, just as he has done in my State numerous times as a trustee for the benefit of the project itself on the water applications.

Governor JOHNSON. That is a different thing.

Senator WATKINS. That is the way they operate. They are trustees for the people under an arrangement of that kind.

Governor JOHNSON. That is right, but that is not the way it was filed on Green Mountain Dam.

Senator WATKINS. It seems to me, Governor, that language you propose would prohibit the generation of electricity in any of these plants. Every one of these on the main stem as well as everywhere else on the project.

Governor JOHNSON. I am sure not, but I am submitting it for what it may be worth.

Now, going back to section 4 again, I want to call your attention to the Boulder Canyon project, and this is the way it is handled in the law.

I want to say this, Senators, that I have been quite disturbed about the possibilities that the profits that are earned from the sale of power on the storage projects may not be dedicated to the development of the Upper Colorado River Basin. It think it is exteremely important that that money be dedicated for that purpose. That is one of the principal arguments for building the reservoirs on the river, that is, the large storage reservoirs.

This is the way the Boulder Canyon project handled the matter. I am reading from the act:

> After the repayments to the United States of all money advanced with interest charges shall be on such basis and the revenues derived therefrom shall be kept in a separate fund to be expended within the Colorado River Basin as may hereafter be prescribed by the Congress.

I want to read from the bill on page 8, line 17, in which it says,

> *Provided*, That revenues credited to the basin fund shall not be available for appropriation for construction of the units and participating projects authorized by or pursuant to this act.

To me there is a vast difference between the two texts. One of them says it is to be used and the other says it cannot be used.

So I have suggested an amendment on line 17, and add a "fifth" there. There are four paragraphs. I add a fifth.

> Any remaining surplus to be available for appropriation for construction of the units and participating projects authorized by or pursuant to this act.

It seems to me that it is very important that in this great project with all of the storage reservoirs and all of the participating projects and all, that the power money ought to be used for the construction of the participating projects remaining in this basin.

Senator WATKINS. As I understand it, the money goes to the United States Treasury, and it is reappropriated under the theory of this bill for this fund. You are doing away with this idea of interest that we had so many arguments about in the past.

Governor JOHNSON. You set up ways that the money can be used, but when you get down to the building of reservoirs, you say, "*Provided*, That revenues credited to the basin fund shall not be available for appropriation for construction of the units and participating projects authorized by or pursuant to this act."

I am making this comparison with the language in the Boulder Canyon Project Act:

> After the repayment to the United States of all money advanced with interest, charges shall be on such basis and the revenues derived therefrom shall be kept in a separate fund to be expended within the Colorado River Basin as may hereafter be prescribed by the Congress.

Senator ANDERSON. Of course, that is what was intended by this. This is the same language exactly in the bill introduced by Senator Millikin, and on which you were a joint author last year and designed to make sure that you cannot come ahead and the man administering the fund out there can build the reservoirs wherever he wishes without submitting the projects to the adjoining States.

This merely requires that you have to come back for the same kind of approval by the Congress, and to permit the other States to register their objections to building reservoirs we now have in the law. Otherwise you would have a tremendous amount of money rolling into the Department of the Interior and they could build reservoirs wherever they wished without reference to the desires of the people of that State or the people of the adjoining States.

Governor JOHNSON. But listen to the proposed amendment that I suggest for it. I suggest in line 17 of the bill after the semicolon, you add this language:

(5) Any remaining surplus to be available only for appropriation for construction of the units and participating projects authorized by or pursuant to this act.

What I am trying to do in that is to tie the profits on the power projects in this bill to a development of the projects in the upper basin. It is my opinion—and my opinion is not expert by any means—that the money that is earned by these powerplants in the upper Colorado River Basin can be used in any reclamation project in any basin outside of the Colorado River. I think it goes into the reclamation fund.

Senator ANDERSON. You understand, of course, that we are now dealing with something in the neighborhood of 2050 as far as years are concerned, because it would take at least that long to finish all the projects that might be available under this out of the earnings. It was our thought at least that probably it could wait and find out if some new source of energy might come in that would reduce the value of some of these water plants. I see no objection to saying that is to be spent within the area. That certainly is contemplated. But it would be a long, long time before all of these projects will have been paid out.

Senator MILLIKIN. Mr. Chairman, it seems to me that that very fact requires some protection that there will be money available to build them when the time comes no matter how far removed. I think the Senator has a good point.

Senator WATKINS. May I call to your attention that there have been many objections to the reclamation program and the interest increment and other things that were converted to the use of the projects. There was an attempt made in this bill to turn all the money in the United States Treasury except certain phases of it, and it was named on page 8, starting in line 3:

These revenues shall be available for defraying the cost of operation, maintenance, and replacements of, and emergency expenditures for, all facilities of the Colorado River storage project and participating projects within such separate limitations as may be included in annual appropriation payments.

What they are attempting to do is not to make available this revenue for the construction purposes, but a limited use for matters I have just mentioned, operation, maintenance, and replacements.

That was to make a clear-cut program in which the money is all appropriated from the United States Treasury for construction purposes and none of this money is converted under any kind of a theory into construction that comes from the operation of the program. That was the attempt made and it was an attempt to meet the objections that were raised time and time again that we were doing some-

thing here that we should not do. Congress took vigorous exception to that interest increment.

Governor JOHNSON. Do you not believe, Senator, that the power profits from the Glen Canyon project should be used for the construction of participating projects in the basin?

Senator WATKINS. If it goes into the Treasury and the United States appropriates the money directly, I have no objection to that program. I have an idea when the thing is finished and paid for, yes, but while it is under operation I think this program meets the objections that were made by so many people to the financing that had been in operation on other projects. That came under violent attack and opposition in the United States Congress.

Governor JOHNSON. I call your attention to the fact that in the Boulder Canyon Project Act, it says after the repayments to the United States of all moneys advanced with interest charges shall be on such basis and the revenues derived therefrom shall be kept in a separate fund to be expended in the Colorado River Basin as may hereafter be prescribed by Congress. You think that was a bad arrangement?

Senator WATKINS. No, I do not. The fact is that a number of years ago I introduced a bill that would accomplish the same purpose on all the reclamation projects after the United States had been made whole. That is not taken care of in this bill. You are aiming at the time if and when the thing is paid for. That is what you are quoting.

Governor JOHNSON. So is this other proposal.

Senator WATKINS. No, this other proposal leaves it wide open what is paid for after the profits come in.

Senator MILLIKIN. This is an evolutionary program. As you pointed out a while ago, Mr. Chairman, it may be a hundred years before we finish the participating projects. What is the matter with the Senator's suggestion?

Senator WATKINS. It brings us right back to the interest increment.

Senator MILLIKIN. I do not see where the interest increment comes in.

Senator ANDERSON. I think there is no objection to a declaration of policy at all if it is necessary. We tried by section 2 to say that in order to achieve such comprehensive developments as will assure the consumptive use in the States of the upper Colorado River Basin of waters and so forth, Congress pledges itself to the construction and operation of all these projects. As I have tried to say, I know that there are projects which will not be paid out and all this money is going to be required until after 2050. If it is necessary to say after 2050, no money shall come out of there, but it shall stay in the Treasury and be used for the development of the upper Colorado River Basin. I have no objection.

Senator WATKINS. I do not either. I did not want to cross that bridge now.

Governor JOHNSON. The difficulty is that this bill, S. 500, takes care of the other States in the upper basin, but Colorado, the State that produces 71.18 percent of the water in the upper basin, has a great many participating projects that are not included in the bill and will not be included in the bill even if the 18 which I have suggested go in.

The other States have had their needs completed by the bill, but we are going to have participating projects in Colorado for a good long time.

My purpose is to get some of that money in the way of profits flowing back for the building of these participating projects.

This comes from the Reclamation Bureau. It shows this. They have a column here, and this was prepared by Mr. Jacobson and presented to the Upper Colorado River Commission, and has a column showing irrigation costs to be repaid from Glen Canyon and Echo Park power. It shows in Utah $90,246,500. For Colorado, it shows $16,595,700.

Senator WATKINS. Is not that reference to the first stages, Governor? You realize that this is a comprehensive program for the development of the waters of the upper Colorado which are allocated under the compact of 1922, and that there had to be various stages of preparation. As I understand it, the projects you recently mentioned you are adding to the bill are ones which have not been developed or investigated to the point where reports have been made on them. They are all contemplated to be under the same sort of a help from the revenues going into the Treasury or whatever it is to make the balance come up to the point where the project will practically pay for itself.

You mentioned several times about the percentage that Colorado gets out of this. I think you overlooked, and probably not purposely, a chart here showing what Colorado has already had in the way of development. I have the Fruitgrowers Dam, $200,741; Grand Valley, $5,667,000. That is, they already have had it or it is provided under the program of construction now underway. Mancos, $3,875,797; Panonia, $1,886,700; Pine River project, over $3,382,000. Another one, $10,663,000. And Colorado-Big Thompson, $159,461,000. A total of $185,137,000.

The other States—Utah has had $17,761,000; Wyoming, 5,989,000; and New Mexico has had $104,000 on the development of the Colorado River.

I know you did not intend to make this misleading but you left out all the projects Colorado has had for the development of the upper basin and the Colorado water rights. I do not know the total amount of water that is being developed or taken care of in this program that I have just read to you, but I do know that apparently in the figures you gave earlier, you left out the evaporation charges on the major dams that should be charged to Colorado. That would be Colorado water, too.

Governor JOHNSON. Colorado, of course, will be charged for the evaporation on the dams that you are reluctant to give us any profits from the production of power. For instance, on Glen Canyon, the evaporation is 626,000 acre-feet plus another 100,000 of silt that otherwise would be measured as water at Lee Ferry. I misstated that. It is 526,000 of evaporation and 100,000 of silt, that otherwise would be measured as water and 51.75 percent evaporation is charged to the State of Colorado under the upper States compact.

Senator WATKINS. Each State gets its proportionate share of the charge.

Governor JOHNSON. That is right. We are not kicking about that, but we think as long as we have to pay for the evaporation of these

reservoirs, that our participating projects ought to receive some of the revenues or profits from them.

Senator WATKINS. I would say that the same fellow that takes in the revenue and keeps it during the period until the time they are paid for is the fellow who appropriates the money for the construction. The revenues from the operation and maintenance can be used for those purposes. What we are trying to do in this bill is to meet the objection—it is somewhat a matter of bookkeeping—if we put the money into the United States Treasury and the payouts come in and are credited to the fund, and the revenues are credited to the extent that we use them for operation and maintenance. Then to make a clean-cut operation, we appropriate directly from the United States Treasury to this project until it is finished.

Now, when it is finished, I will agree with you. My own personal view is after these projects have been paid for, the people who have paid for them should own them. They should pay the United States in full, and the United States should get out except for the protection of whatever rights it has for navigation and wildlife and other things of that sort. That is not here. Nobody approved my bill when I introduced it.

Senator ANDERSON. Governor, may I say this, that I do not believe there is anybody concerned in this problem who does not want Colorado to have the fullest possible development of its resources, who does not want Colorado to get participating projects up to the full amount that it is entitled to. We are only trying in this bill to dispose of about 1,700,000 acre-feet out of some 4 or 5 million acre-feet available to the upper basin States. I do not believe there is the slightest wish on anybody's part to keep Colorado from having participating projects and have them paid for. You recognize that there was a long time a little difficulty in Colorado in deciding just how the water resources of that State should be done. Perhaps that has delayed to some degree the preparation of eligible projects. But we are as happy as we can be to see proper projects come in from Colorado. There is not anybody I know of on this committee or in Congress that would like those shunted to one side.

Senator MILLIKIN. I understand the Senator's point. He wants to be sure that there is money available to build those projects.

Senator ANDERSON. I think some declaration can be put in there to cover that.

Senator MILLIKIN. We are not at the early end of the construction. The Senator, as I understand his point, is looking forward to the day when it will take money to do the job, and he wants to be sure there are normal safeguards there.

Senator ANDERSON. I think that is a proper precaution.

Senator WATKINS. There is one thing we should keep in mind, that the repayment contracts even on the small projects contain a provision subject to the appropriations by the Congress. No future Congress can be bound to make appropriations. If they should suddenly stop making those appropriations, we would all be in the same spot.

Senator MILLIKIN. That would wash out the whole project.

Senator WATKINS. It might.

Senator MILLIKIN. We are not going to work here and build up an act on the theory that it is going to be wiped out by a future Congress.

Senator WATKINS. We do not expect it to be. That is why I say, if this program which comprehends the full development, including all States——

Senator MILLIKIN. Governor Johnson is making the point, as I understand it, that when the time comes that Colorado comes in with its participating projects, where is the money coming from? He wants the language in the bill to assure it coming from the basin.

Governor JOHNSON. That is correct.

Senator WATKINS. Then you have to change the whole theory of this repayment setup.

Senator MILLIKIN. I do not think so.

Senator ANDERSON. I think you might be able to protect that point without too much trouble, and as far as I am concerned, I am not opposed to protecting it.

Senator WATKINS. I am not either, as far as we can do it.

Governor JOHNSON. The point is that in this bill the participating projects of Wyoming, Utah, and New Mexico are included. The projects for the State of Colorado are not included, and we have many participating projects. It would just seem to me that it would be only fair to assure these participating projects in Colorado which are left out of this bill that they would be taken care of the same as the participating projects that are already listed in the bill.

Senator ANDERSON. I think that might be possible.

Senator WATKINS. I would not object to that.

Senator MILLIKIN. That is all the Governor is trying to do, as I understand it.

Governor JOHNSON. That is correct.

Senator WATKINS. If we modify this language we get back to interest increment.

Senator MILLIKIN. We have to conform the language to the proper concept and the proper concept is the one Governor Johnson has suggested, that since there will be future participating projects out of the river system there should be money to do the business.

Senator WATKINS. We will all agree to that.

Senator MILLIKIN. That is all the Governor is talking about. It is not an unprecedented thing. He has read from the Boulder Canyon Act.

Governor JOHNSON. I would like to call Mr. Larson back to the witness stand, and have him go into more detail about these 18 projects that have been approved by the Upper Colorado River Commission, the Colorado State Board of Water Conservation, the General Assembly of the State of Colorado, and we hope that they will be included by this committee.

Mr. Larson has some additional data that I think ought to go into the record with respect to these 18 projects. I ask that he be called to the witness stand to offer that testimony.

Senator ANDERSON. You will have no difficulty on that. We are very anxious to have that information in the record.

Governor JOHNSON. I am sure you are.

Senator MILLIKIN. Mr. Chairman, I would like to have the Governor emphasize again, if it is not sufficiently emphasized, that these 18 projects have been approved by the Upper Colorado River Commission, by the State water board, by the State Legislature of Colorado.

Senator ANDERSON. I am glad to have that emphasis, because I really believe, Governor Johnson, that one of the reasons why there are more projects from other areas than your State is that there was not for a substantial period of time representations made by your State as to the projects upon which there had been agreement. As rapidly as that agreement comes forward, and the material is ready, we are extremely anxious to add those projects to the bill.

Governor JOHNSON. I want to make one other request. Later on I think this subcommittee is going to hold hearings on Senate bill 300, and I will not be able to come back when you take testimony on S. 300, the so-called Frying Pan-Arkansas, but I would like to hand to you now my testimony with respect to that project, and ask that at the proper time it be added to the testimony.

Senator MILLIKIN. I move that be done.

Senator ANDERSON. I will say to you, Governor Johnson, that we intend to have hearings on the Frying Pan-Arkansas upon the conclusion of these, and a reasonable time for the preparation of the material to go to the printer. Just as soon as that is finished, we intend to go forward with the Frying Pan-Arkansas project, and if you will leave your statement with the committee, it will be put in the record at the opening of the hearings on that.

Governor JOHNSON. Thank you very much, Mr. Chairman. That is all that I have to say.

Senator KUCHEL. Mr. Chairman, there are some questions which, if the Governor would permit, I would like to ask him either now or subsequent to Mr. Larson's statement. Would that be agreeable to you, Governor?

Governor JOHNSON. Yes, sir; if it is agreeable to the committee.

Senator ANDERSON. Do you want to do it now?

Senator KUCHEL. Perhaps it would be better if you heard from Mr. Larson first, Mr. Chairman.

Senator ANDERSON. You may proceed, Mr. Larson.

STATEMENT OF E. O. LARSON, REGIONAL DIRECTOR, BUREAU OF RECLAMATION, REGION 4, SALT LAKE CITY, UTAH

Mr. LARSON. Mr. Chairman, Assistant Secretary Aandahl explained yesterday to the committee that the Department must withhold recommendations on any projects for which reports have not been completed and reviewed by the affected States, the interested Government agencies, and the Bureau of the Budget. It was my purpose to prepare such information as we have on those additional projects referred to in House bill 3384. I did not submit them yesterday because those particular projects were not included in Senate bill 500.

I have with me a short one-page statement and a summary sheet showing the irrigated acreage, the principal agricultural production, the water supply, construction costs, annual operation and maintenance cost, and benefit-cost ratio of the 20 additional projects in House bill 3384, 18 of which I believe were referred to by Governor Johnson in his statement this morning.

Senator O'MAHONEY. Mr. Chairman, may I ask Mr. Larson if this summary includes the Sublette unit in Wyoming.

Mr. LARSON. Yes; I will cover that in just a moment. It does include it.

Senator ANDERSON. I wish to state for the record that the reason these projects were not listed at all in Senate bill 500 was that we were anxious to get a bill before the Congress and it was clearly understood at the time it was introduced that Governor Johnson would have an opportunity to appear and new testimony might be introduced on these and probably the other projects. We felt we had testimony on the projects already in the bill. By introducing the bill and coming to hearings, Governor Johnson would be able to present his general request, and you would be able to supply us some additional material. That is the reason why they were not in the bill as originally drafted.

Senator MILLIKIN. I would like to ask the witness whether the tabulation Governor Johnson has furnished us is an accurate tabulation?

Mr. LARSON. The depletions I cannot check. The costs are very close to the estimated costs we have. The costs that Senator Johnson gave came from our reports. Since these reconnaissance reports were prepared some years ago, we have brought the costs up to date in our tabulations as of October 1954.

In some cases the total project cost of these 20 projects is slightly reduced and in some cases increased.

Senator MILLIKIN. Generally speaking, is Governor Johnson's tabulation accurate—made from Bureau statistics?

Mr. LARSON. Yes. The benefit-cost ratios I think are almost identical. We tried to check the depletions as he read them off, and I believe they are the same except for two projects.

Senator ANDERSON. Governor Johnson, did you offer this for the record?

Governor JOHNSON. I meant to.

Senator ANDERSON. Let it be understood without objection that the tabulation that is referred to will be added to Governor Johnson's remarks at the point originally referred to them.

Senator MILLIKIN. May I ask one further question, Governor Johnson? Is it your purpose to change the projects advocated for other States in any way?

Governor JOHNSON. No, sir. I made no suggestions that any project in any other State be changed in any way except that my amendment did include two projects in Wyoming that were approved by the Upper Colorado River Board. That is the only change that I made.

Senator MILLIKIN. You mean we are not trying to increase the share of Colorado at the expense of what has been determined for other States.

Governor JOHNSON. That is a correct statement.

Mr. LARSON. I would like to explain to the committee the status of investigations on these 20 projects. We have detailed feasibility reports on the Fruitgrowers Dam extension project in Colorado, and the Savery-Pot Hook project in Colorado and Wyoming.

The projects presently under investigation are the Dolores project in Colorado and Utah, and the Sublette project in Wyoming. We are, you might say, a little beyond the reconnaissance stage. We have reconnaissance reports on these projects and we are going on with our investigation in more detail.

The projects on which we have reconnaissance information only are the Battlement Mesa, the Bluestone, Bostwick Park, Dallas Creek, Eagle Divide, East River, Fruitland Mesa, Grand Mesa, Ohio Creek, Parshall, Rabbit Ear, Tomichi Creek, Troublesome, West Divide, and Woody Creek, all in Colorado.

I assume you do not want me to read the one-page statements. I have them here with maps attached for filing for the record.

Senator ANDERSON. Will you do this with the approval of Senator Millikin and Governor Johnson? Would you briefly mention the project report, testify as to what is in your report on that, and file the rest of it for the record? What type of project is this Fruitgrowers Reservoir, how large is it, and how far along are you with it in your study? Is it an alteration to an existing project?

Mr. LARSON. Yes, it is an extension of the Fruitgrowers Dam project in Colorado, and it would add in 1,850 acres of new land and furnish a supplemental supply on 2,000 acres now inadequately irrigated.

Do you want me to give the stream depletion and construction cost?

Senator ANDERSON. No, how much per acre would it add to the land that is now being farmed. Would it be a burden that is oppressive at all to the farmer?

Mr. LARSON. No, the 1,850 acres of new land and the 2,000 acres needing more water would pay up to their repayment ability. The balance of the cost would come from the power revenues in the plan of the Colorado storage project.

Senator ANDERSON. You think the project is feasible?

Mr. LARSON. Yes.

Senator ANDERSON. It has a high rating of feasibility?

Mr. LARSON. Yes, sir.

Senator ANDERSON. Are there any questions on the first one of these projects?

As I understand it, these two pages dealing with the Fruitgrowers Dam project extension will be inserted in the record at this point.

(The information referred to follows:)

STATEMENT ON THE FRUITGROWERS DAM PROJECT EXTENSION, COLORADO

The Fruitgrowers Dam project extension would utilize surplus flows of Grand Mesa tributaries of the Gunnison River in the upper Colorado River Basin to provide supplemental irrigation water for 2,000 acres of presently irrigated lands and a new water supply for 1,850 acres of nonirrigated lands.

Development of the extension would increase yield rates and permit more extensive farming than is presently practiced in the area. Most of the new acreage would probably be devoted to fruit, corn, and alfalfa and, due to provision of additional late season water, much of the presently irrigated land would also be utilized for more intensive farming.

The existing Fruitgrowers Reservoir would be enlarged from its present capacity of 4,500 acre-feet to 11,500 acre-feet and its water supply would be increased by diversions from Ward and Surface Creeks through the potential 6-mile Tongue Creek feeder canal. The area receiving water from the reservoir would be enlarged through construction of the Eckert pumping plant and pump canal and enlargement and extension of the Circle Ditch. The water thus replaced consisting of natural flow of Surface Creek and storage water released from reservoirs on Grand Mesa, would be transferred under exchange agreements to higher lands in the extension area. The only new water developed for the service area of Fruitgrowers Reservoir would be used on 150 acres of presently nonirrigated land.

Land classification surveys show the extension lands to be suitable for sustained production of crops under irrigation farming. Water supply studies,

based on records of streamflows as they have occurred in the past, indicate that an adequate irrigation supply would be available for the extension with permissible shortages in occasional drought years. Water rights for the project can be obtained under Colorado State law and it is anticipated that the necessary exchange agreements can be arranged satisfactorily.

This statement is based on the physical plan of project development presented in the Bureau of Reclamation report on the Fruitgrowers Dam project extension, Colorado. Results of the current (October 1954) Bureau of Reclamation estimates for this project plan are summarized in the following tabulation.

Summary data, Fruitgrowers Dam project extension, Colorado

Irrigated acreage:	*Acres*
New irrigation service land	1,850
Supplemental irrigation service land	2,000
Total	3,850
Principal agricultural production:	
Alfalfa, grain, apples, peaches, dairy cows, and beef cattle.	
Water supply:	*Acre-feet*
Average annual increase in irrigation supply	7,470
Average annual increase in stream depletion	5,540
Project works:	
Construction features include enlargement of existing Fruitgrowers Reservoir from present capacity of 4,500 acre-feet to 11,500 acre-feet, 6-mile Tongue Creek feeder canal, Eckert pumping plant and pump canal, and Circle ditch extension.	
Construction cost and repayment:	
Estimated costs:	
Reimbursable allocation to irrigation	$6,690,000
Nonreimbursable allocation	None
Repayment by:	
Irrigation waters users	470,000
Revenue from Colorado River storage project	1,220,000
Total	1,690,000
Annual operation, maintenance, and replacement costs	9,300
Benefit-cost ratio: 2.5 to 1.	

Senator ANDERSON. If there are additional questions as to the feasibility of this project or its characteristics, let us have them now. Actually this is a much higher degree of feasibility than there ordinarily is in a reclamation project.

Mr. LARSON. That is correct.

Senator ANDERSON. The benefit ratio is much higher.

Mr. LARSON. Yes. The next is the Savery-Pot Hook project in Colorado and Wyoming.

Senator ANDERSON. What type of project is this?

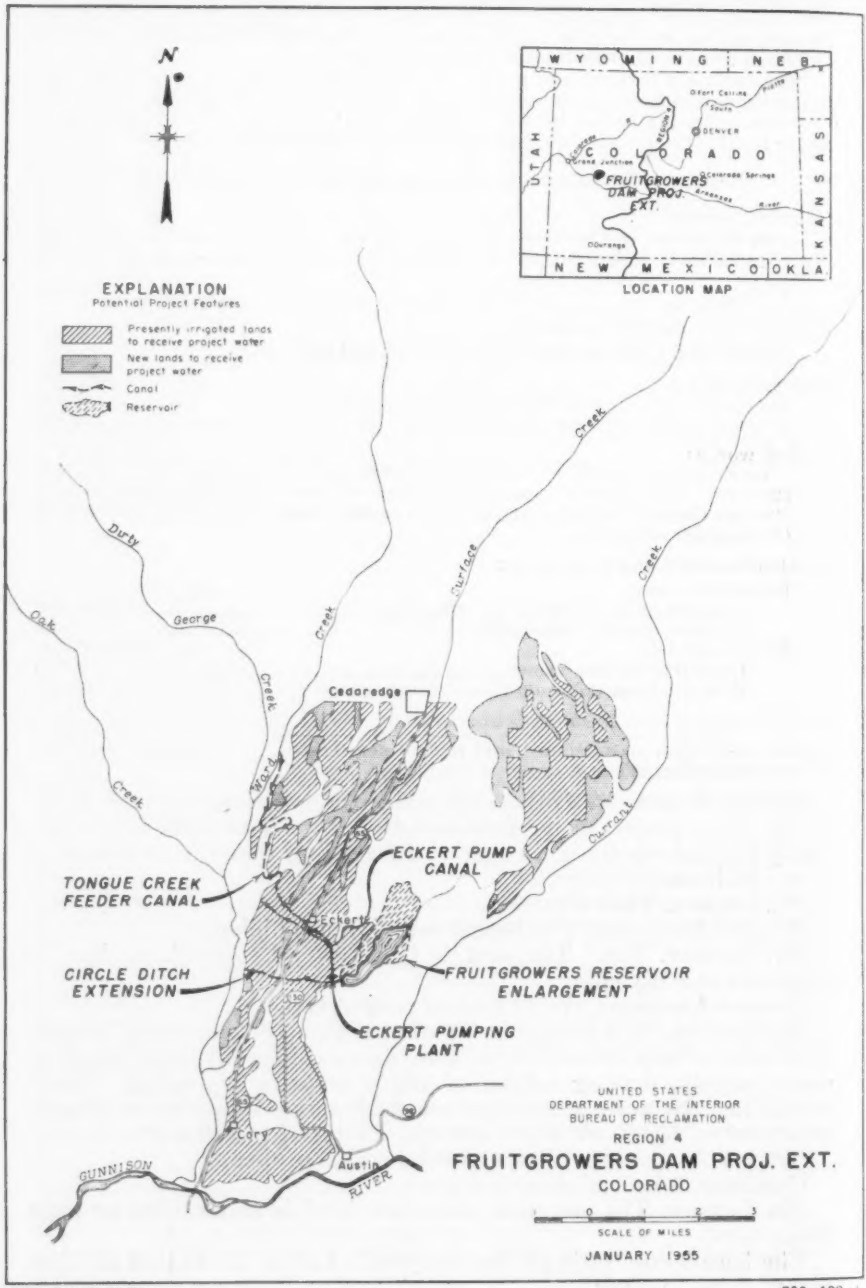
Mr. LARSON. The project at a rather high elevation would include 6,180 acres of new land and 9,870 acres that would receive supplemental water supply, making a total of 16,150 acres in Wyoming. There would be 12,200 acres of new land and 3,260 acres of supplemental land, or a total of 15,460 acres in Colorado, a total of 31,610 acres.

Senator ANDERSON. What elevation is this project?

Governor JOHNSON. Nearly 6,000.

Mr. LARSON. The elevation above sea level is about 6,000 or near that.

The benefit-cost ratio of that project is 1.28 to 1. Is that all that you wish me to cover?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COLORADO
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DENVER
FRUITGROWERS DAM PROJ. EXT.
LOCATION MAP
EXPLANATION
Potential Project Features
Presently irrigated lands to receive project water
New lands to receive project water
Canal
Reservoir
Dirty George Creek
Oak Creek
Surface Creek
Cedaredge
Ward
Currant Creek
TONGUE CREEK FEEDER CANAL
ECKERT PUMP CANAL
Eckert
CIRCLE DITCH EXTENSION
FRUITGROWERS RESERVOIR ENLARGEMENT
ECKERT PUMPING PLANT
Cory
Austin
GUNNISON RIVER
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
REGION 4
FRUITGROWERS DAM PROJ. EXT.
COLORADO
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Senator ANDERSON. I would like to ask you just a question or two. This is largely then to increase feed production in an area where the feeding of livestock is ordinarily a profitable venture?

Mr. LARSON. That is correct.

Senator ANDERSON. This will provide both new and supplemental water supply?

Mr. LARSON. Yes, sir.

Senator ANDERSON. Your Bureau feels that it is a feasible project on the basis of studies thus far completed?

Mr. LARSON. Yes; it has a favorable benefit-cost ratio.

Senator ANDERSON. Are there any additional questions on the Savery-Pot Hook project?

If not, it will be inserted in the record.

(The information referred to follows:)

STATEMENT ON SAVERY-POT HOOK PROJECT, COLORADO AND WYOMING

The potential Savery-Pot Hook project would provide supplemental irrigation water for 13,230 acres of presently irrigated lands and a new supply for 18,380 acres of nonirrigated lands located in northwestern Colorado and southcentral Wyoming. The additional water would be made available through utilization of surplus flows of streams of the Little Snake River Valley, a part of the upper Colorado River Basin.

Although an improved irrigation supply would permit new lands to be cultivated and result in better crop yields on presently irrigated lands, the cropping program is largely controlled by climatic, soil, and topographic conditions. Most of the acreage would continue to be utilized for the production of livestock feed with hay, small grains, and pasture predominating. Increased feed production in the area would result in substantial increases in dairy products with some increase in the production of sheep, beef, cattle, hogs, and poultry.

Detailed land classification surveys show the project lands to be suitable for sustained production of crops under irrigation farming. Water supply studies, based on recorded stream flows of the past, indicate that an adequate irrigation supply would be available for the project with permissible shortages in drought years. Water rights for the project can be obtained under the laws of Colorado and Wyoming in accordance with article XI of the upper Colorado River Basin compact which deals specifically with water rights and interstate use of water of the Little Snake River and its tributaries.

Potential storage features of the project include the 65,000 acre-foot Pot Hook Reservoir located on Slater Creek and the 18,600 acre-foot Savery Reservoir located on Savery Creek. Part of the project water would be distributed by existing canals and ditches diverting from Savery Creek and the Little Snake River, including a 15.7-mile extension of the Westside Canal. The remaining project water would be distributed by the 19.2-mile Dolan Mesa Canal heading on Savery Creek and 58.2-mile Pot Hook Canal heading at Pot Hook Reservoir. Other construction features include the diversion dam for the Dolan Mesa Canal and about 5.3 miles of drains.

This statement is based on the physical plan of project development presented in the Bureau of Reclamation proposed report of the regional director on the Savery-Pot Hook project dated July 1954. Results of the current (October 1954) Bureau of Reclamation plan are summarized in the following tabulation.

Summary data, Savery-Pot Hook project, Colorado and Wyoming

Irrigated acreage:

	Wyoming	Colorado	Total
Full irrigation service land	6,180	12,200	18,380
Supplemental irrigation service land	9,970	3,260	13,230
Total	16,150	15,460	31,610

Principal agricultural production:
Alfalfa, small grains and pasture, dairy cattle and sheep.

Water supply:	*Acre-feet*
Average annual increase in irrigation supply	54,600
Average annual increase in stream depletion	33,400

Project works:
Construction features include the 65,000 acre-foot Pot Hook Reservoir, 18,600 acre-foot Savery Reservoir, Dolan Mesa diversion dam and 19.2-mile canal, 58.2 mile Pot Hook Canal, 15.7-mile extension of Westside Canal, Willow Creek lateral, and 5.3 miles of drains.

Construction cost and repayment:	
Estimated cost:	
Reimbursable allocation to irrigation	$10,814,000
Nonreimbursable allocation	None
Repayment by—	
Irrigation water users	1,390,000
Net power revenues from Colorado River storage project	9,424,000
Total	10,814,000
Annual operation, maintenance, and repair costs	65,600

Benefit-cost ratio, 1.28 to 1.

Mr. LARSON. The third project is the Dolores project in Colorado, and the statement I have here is based on reconnaissance information only. We do not have a detailed project report.

Senator ANDERSON. This deals with land both presently irrigated and new land coming in?

Mr. LARSON. That is right. Shall I read the acreage?

Senator ANDERSON. Yes; I think it would be beneficial.

Mr. LARSON. There are 35,400 acres of new land and 30,550 acres of supplemental lands, or a total of 66,000 acres.

The benefit-cost ratio here is computed at 1.1 to 1.

Senator ANDERSON. On that question right there, where you seem to have a close benefit-cost ratio, has it not been your experience that in many of these reclamation projects even though the benefit ratios appear to be close, the indirect benefits to the communities and the final value of the project to the adjoining land is sometimes very substantial?

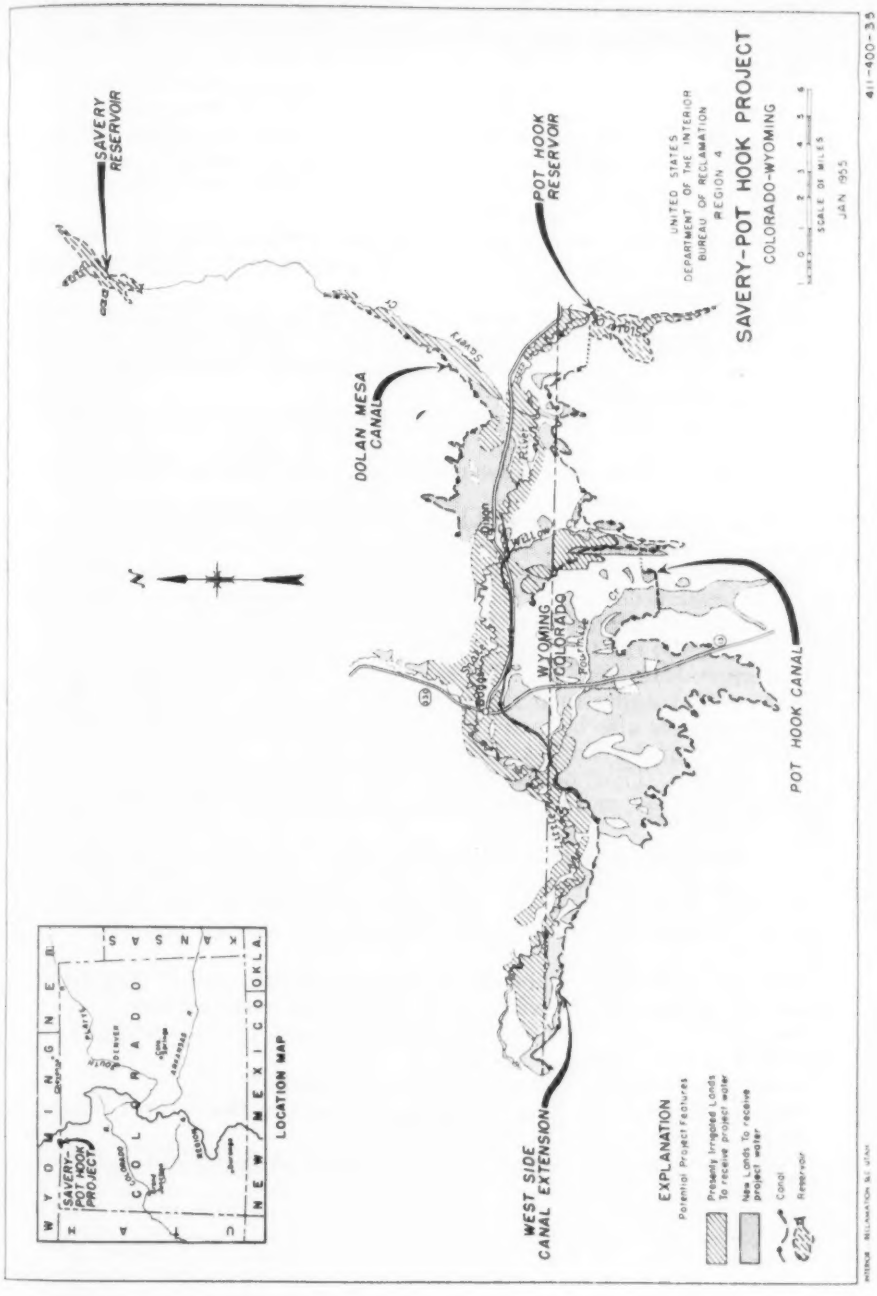
Mr. LARSON. Yes; that is correct. The intangible benefits in other words are generally very large and something that we do not attempt to evaluate.

Senator ANDERSON. And therefore this would be the type of project that you would look at pretty carefully and try to be helpful to if you could.

Mr. LARSON. That is correct. But in the final analysis and detail reports, we certainly try to improve the project plan so that the benefit-cost ratio is better.

Senator ANDERSON. These that are in the shape these are in would probably have to be like some of the other participating projects mentioned in the bill, they might have to come back for congressional approval later on or wait subsequent approval by the Secretary of the Interior. Action by this committee would not necessarily be a final commitment on the part of the Government.

Mr. LARSON. No, sir. All of the projects as I understand the bill would be subject to a detailed report.


SAVERY RESERVOIR
POT HOOK RESERVOIR
DOLAN MESA CANAL
WEST SIDE CANAL EXTENSION
POT HOOK CANAL
WYOMING
COLORADO
SAVERY-POT HOOK PROJECT
COLORADO-WYOMING
UNITED STATES
DEPARTMENT OF THE INTERIOR
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JAN 1955
SCALE OF MILES
EXPLANATION
Potential Project Features
Presently Irrigated Lands To receive project water
New Lands To receive project water
Canal
Reservoir
LOCATION MAP
WYOMING
NEBR.
COLORADO
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Senator KUCHEL. I was just going to ask, as you go along in here, do you include figures that indicate the cost per acre of the land to be irrigated?

Mr. LARSON. You can arrive at that figure if you notice on the next one for the Sublette project, for example. We give 72,000 acres of new land, 12,000 acres of supplemental land, or a total of 84,000. Then we give the construction costs, the amount that the irrigators are able to repay in a 50-year period, and the balance that must come from power revenues if it were authorized.

Senator KUCHEL. Just to save a little time arithmetically, I wonder if you could file a breakdown project by project indicating what the cost per each acre would be?

Mr. LARSON. We can do that by dividing the total acres into the total cost, and giving the average cost per acre. That is about as near as we can come to it. It is very hard to separate costs for new and supplemental lands.

Senator KUCHEL. Would you file that with the committee, Mr. Larson?

Mr. LARSON. Yes, sir. We can file that and would be very glad to do it.

Senator ANDERSON. You will have to make some differentiation between new land and the supplemental water, will you not?

Mr. LARSON. We will give you the average cost. It is very difficult to try to break it down into new land and supplemental lands. But we can give you an average cost very readily by dividing the total reimbursable cost by the total acres.

Governor JOHNSON. Mr. Chairman, may I ask a question that I might see if I understood the action that has been asked for. Will those appraisals also be made for all of the participating projects in the bill in all of the States as well as these 18?

Mr. LARSON. That was presented for each project at the House hearings last year, and we are prepared to give that average cost again this year.

Governor JOHNSON. Is that the question that the Senator from California has asked, all projects in the bill, and not only these 18?

Senator KUCHEL. Yes, sir. I did not think that we did have that type of information, Governor, in the printed hearings last year. Is that correct, Mr. Larson?

Governor JOHNSON. It ought to be put together, and if they have them all worked out it will not be difficult to restate them.

Senator KUCHEL. I would ask, Mr. Chairman, that all projects be included in a supplemental report.

Governor JOHNSON. All participating projects.

Senator KUCHEL. All participating projects in the several States.

Senator ANDERSON. That will be done.

(The table and summary of data for Dolores project, Colo., referred to follows:)

Estimated construction cost allocated to irrigation and average cost per acre, initial participating projects and other potential irrigation projects

INITIAL PARTICIPATING PROJECTS

Project	State	Acreage (supplemental and new)	Construction cost allocated to irrigation	
			Total	Average project cost per acre
La Barge	Wyoming	7,970	$1,673,300	$210
Seedskadee	do	60,720	23,272,000	383
Lyman	do	40,600	10,564,000	260
Silt	Colorado	7,300	3,282,400	450
Smith Fork	do	10,430	3,343,000	321
Paonia	do	17,010	6,791,000	398
Florida	do	18,950	6,503,600	343
Pine River Extension	Colorado–New Mexico	15,156	5,027,000	332
Emery County	Utah	24,080	9,636,500	400
Central Utah	do	160,380	127,354,000	794
Hammond	New Mexico	3,670	2,302,000	627
Eden	Wyoming	20,200	7,287,000	361

ADDITIONAL PARTICIPATING PROJECTS

PROJECTS ON WHICH FEASIBILITY REPORTS HAVE BEEN COMPLETED IN THE FIELD

Gooseberry	Utah	16,400	$5,727,500	$349
Navajo	New Mexico	137,250	209,939,300	1,530
San Juan-Chama	do	225,000	107,924,000	480
Fruitgrowers Dam extension	Colorado	3,850	1,690,000	439
Savery-Pot Hook	Colorado–Wyoming	31,610	10,814,000	342

PROJECTS PRESENTLY UNDER INVESTIGATION

Dolores	Colorado–Utah	66,000	$24,633,000	$373
Sublette	Wyoming	84,000	36,146,000	430

PROJECTS ON WHICH RECONNAISSANCE INVESTIGATIONS ONLY ARE COMPLETE

Battlement Mesa	Colorado	6,830	$5,853,700	$857
Bluestone	do	10,875	3,329,000	306
Bostwick Park	do	6,870	2,634,000	384
Dallas Creek	do	21,940	10,330,000	471
Eagle Divide	do	10,875	3,411,700	314
East River	do	2,750	212,000	77
Fruitland Mesa	do	9,400	11,551,000	596
Grand Mesa	do	25,300	20,164,000	797
Ohio Creek	do	16,910	3,402,000	201
Parshall	do	27,510	11,881,900	432
Rabbit Ear	do	19,190	4,733,500	247
Tomichi Creek	do	27,580	11,523,000	418
Troublesome	do	13,640	5,243,000	384
West Divide	do	65,610	79,675,600	1,214
Woody Creek	do	2,965	177,700	60

STATEMENT ON DOLORES PROJECT, COLORADO

(Reconnaissance data)

The potential Dolores project is planned primarily to store and divert waters of Dolores River to supply irrigation water for 66,000 acres of land in the San Juan River Basin in southwestern Colorado. The lands include 30,550 acres presently irrigated with only a partial water supply and 35,450 acres not now irrigated. The project lands lie near the towns of Cortez and Dove Creek, Colo.

With project development the irrigated lands would be utilized largely for the support of the livestock enterprises as now practiced in the area. Climatically adapted crops such as alfalfa, pasture, small grains, corn, and pinto beans would be produced. Livestock would be mostly dairy cows and beef cattle.

Preliminary land classification surveys indicate that the lands would be suitable for sustained crop production under irrigation farming. A detailed classification would be necessary to confirm the suitability of all the lands.

Water-supply studies, based on records of streamflows as they have occurred in the past, indicate that an adequate irrigation supply would be available for the project with permissible shortages in occasional drought years. The average annual water supply to full irrigation service land would be 131,620 acre-feet and the supply to supplemental irrigation service land would be 14,170 acre-feet for a total supply of 145,790 acre-feet. With the anticipated cooperation of present water users in the area, water rights for the project could be obtained under Colorado State law.

Principal construction features of the project would include the McPhee Reservoir with a total capacity of 328,000 acre-feet and an active capacity of 153,000 acre-feet that would be created by a dam on Dolores River 10 miles downstream from the town of Dolores. Two diversion outlets from the reservoir would replace two existing diversions from Dolores River to serve lands in Montezuma Valley. The potential Yellow Jacket Canal would convey water about 24 miles northwest from one of the reservoir outlets to the potential North and South Canals that would serve unirrigated lands in the Dove Creek area. Laterals would be constructed to serve all project lands not presently irrigated. An estimated construction period of 4 years would be required to complete all features of the project.

This statement is based on the physical plan of project development presented in the Bureau of Reclamation status report on the Dolores project, dated May 1954. Results of current (October 1954) Bureau of Reclamation reconnaissance estimates for this project plan are summarized in the attached project summary tabulation.

Summary reconnaissance data, Dolores project, Colorado

Irrigated acreage:

[Acres]

	Montezuma Valley area	Dove Creek area	Total
New lands	9,450	26,000	35,450
Supplemental lands	30,550	0	30,550
Total	40,000	26,000	66,000

Principal agricultural production:

Alfalfa, small grains, pasture, and beans.

Dairy cows and beef cattle.

Water supply:

[Acre-feet]

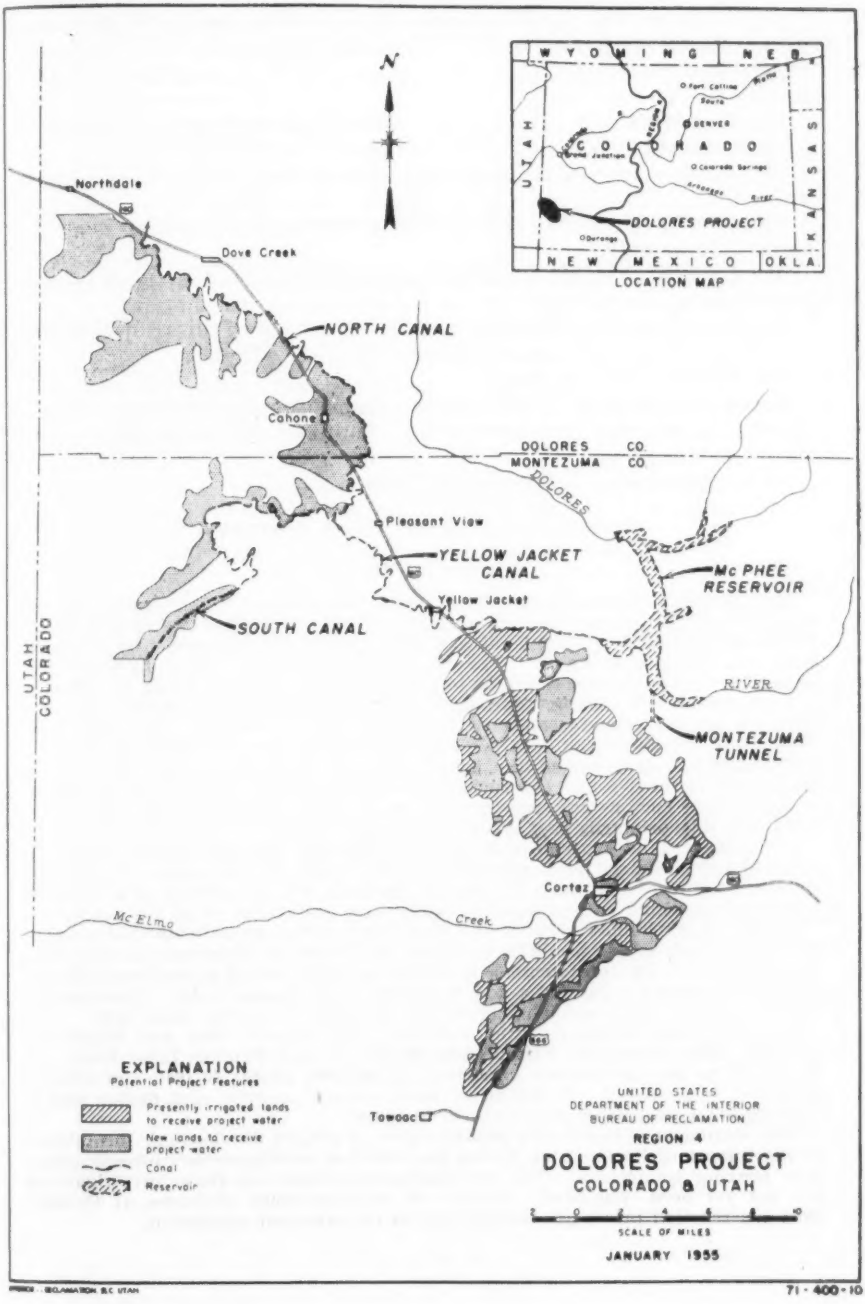
	Montezuma Valley area	Dove Creek area	Total
Average annual project supply:			
New lands	31,780	99,840	131,620
Supplemental lands	14,170	0	14,170
Total	45,950	99,840	145,790
Average annual stream depletion			69,370

Project works:

Construction features would include McPhee Dam and Reservoir of 328,000-acre-foot total capacity on Dolores River; 24-mile, 440-second-foot Yellow Jacket Canal; 46.2-mile, 330- to 340-second-foot North Canal; 24.5-mile, 100- to 30-second-foot South Canal; laterals; and drains.

Construction cost and repayment:	
Estimated cost	$24,633,000
Reimbursable allocation to irrigation	24,633,000
Nonreimbursable allocation	None
Repayment by:	
Irrigation water users	1,533,000
Power revenues from Colorado River storage project	23,100,000
Total	24,633,000
Annual operation, maintenance, and replacement costs	109,300

Benefit-cost ratio, 1.1 to 1.


N
WYOMING
NEB
COLORADO
UTAH
KANSAS
NEW MEXICO
OKLA
DENVER
DOLORES PROJECT
LOCATION MAP
Northdale
Dove Creek
NORTH CANAL
Cahone
DOLORES CO.
MONTEZUMA CO.
DOLORES
Pleasant View
YELLOW JACKET CANAL
Mc PHEE RESERVOIR
Yellow Jacket
SOUTH CANAL
UTAH
COLORADO
RIVER
MONTEZUMA TUNNEL
Cortez
Mc Elmo
Creek
Towaoc
EXPLANATION
Potential Project Features
Presently irrigated lands to receive project water
New lands to receive project water
Canal
Reservoir
UNITED STATES
DEPARTMENT OF THE INTERIOR
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REGION 4
DOLORES PROJECT
COLORADO & UTAH
SCALE OF MILES
JANUARY 1955
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Senator ANDERSON. Would you just come to the Sublette project? You say it has both undeveloped lands and some lands now irrigated?

Mr. LARSON. The Sublette project is located at a rather high elevation in the Green River Basin in Wyoming, and consists of 72,000 acres of new land, and 12,000 acres of supplemental land, or a total of 84,000 acres.

Senator ANDERSON. The amount of food that can be grown upon this is pretty hard to calculate. Most of it would be grazing?

Mr. LARSON. It would be almost entirely hay, pasture, and small grains.

Senator ANDERSON. Is this an area here livestock growing is a substantial industry?

Mr. LARSON. Yes, the principal industry being beef cattle and sheep in that area.

Senator ANDERSON. Therefore, the development of this project would be very useful to the livestock industry in the two States.

Mr. LARSON. That is corect.

Senator ANDERSON. Are there any questions on the Sublette project? If not, the material that has just been supplied will be inserted in the record at this point.

(The information referred to follows:)

STATEMENT ON SUBLETTE PROJECT, WYOMING

(Reconnaissance data)

The potential Sublette project is planned to store and divert waters of the upper Green River and its tributaries to supply irrigation water for about 72,000 acres of undeveloped lands and 12,000 acres of lands presently irrigated with an inadequate supply. The plan also includes a small hydroelectric powerplant. The project would be located in the Green River Basin in Sublette County, western Wyoming. Although reconnaissance studies to date indicate that the project would consist of two independent divisions (Buckskin and West Side divisions), the data presented herein are for the overall project.

With project development the irrigated lands would be utilized largely for the support of the livestock enterprises as now practiced in the area. Climatically adapted crops such as hay, pasture, and small grains would be produced. Livestock would be primarily beef cattle and sheep.

Preliminary land classification surveys indicate that the lands would be suitable for sustained crop production under irrigation farming. A detailed classification has been made for part of the area but completion of a detailed classification would be necessary to confirm the suitability of all the lands.

Studies of streamflow records and simulated operations indicate that an adequate irrigation supply would be available with moderate shortages in occasional drought years. The total increase in irrigation supply would approximate 268,000 acre-feet annually from direct-flow diversions and storage yield. Water rights for the project could probably be obtained under Wyoming State law.

Principal construction features would include Kendall Dam and Reservoir, Fremont Lake Reservoir, Burnt Lake Reservoir, and Boulder Lake Dam and Reservoir to provide storage capacities of 162,000, 64,000, 30,000, and 165,000 acre-feet, respectively. A system of main canals, laterals, and drains and a 2,200-kilowatt powerplant would also be included.

This statement is based on a physical plan of project development formulated by the Bureau of Reclamation during the course of reconnaissance investigations now nearing completion. The reconnaissance report on these investigations has not yet been completed. Results of reconnaissance estimates at October 1954 construction prices are summarized in the attached tabulation.

Summary reconnaissance data, Sublette project, Wyoming

Irrigated acreage:		*Acres*
New land		72,000
Supplemental lands		12,000
Total		84,000
Principal agricultural production:		
Hay, pasture, and small grains.		
Beef cattle and sheep.		
Water supply:		*Acre-feet*
Increase in average annual direct-flow diversions		142,000
Increase in average annual storage yield		126,000
Stream depletion (average annual)		108,000
Project works:		
Construction features would include Kendall Dam and Reservoir, Fremont Lake Reservoir, Burnt Lake Reservoir, and Boulder Lake Dam and Reservoir providing storage capacities of 162,000, 64,000, 30,000, and 165,000 acre-feet, respectively; a system of main canals and laterals; drains; and a 2,200-kilowatt powerplant.		
Construction cost and repayment:		
Estimated construction cost		$37,099,000
Reimbursable cost allocated to irrigation		36,146,000
Reimbursable cost allocated to power		953,000
Nonreimbursable allocation		None
Repayment in 50 years by:		
Irrigation water users	$1,350,000	
Project power revenues	953,000	
Power revenues from Colorado River storage project	34,796,000	
Total		37,099,000
Annual operation, maintenance, and replacement costs:		
Irrigation	$168,000	
Power	25,000	
Total		193,000
Benefit-cost ratio		1 to 1

Senator ANDERSON. Will you give us a statement on the Battlement Mesa project?

Mr. LARSON. That project consists of 6,780 acres of new land, 50 acres of supplemental land, or a total of 6,830.

Senator ANDERSON. As a project this is a rather small project.

Mr. LARSON. Yes; this is a rather small project.

Senator ANDERSON. The tabulation submitted by Governor Johnson shows some 25,000 acre-feet of water. That is about right for these 6,000 acres at high elevation?

Mr. LARSON. Yes. The increase in annual water supply is 22,800 acre-feet.

Senator ANDERSON. This is again a project that ties into the livestock economy of that part of the State.

Mr. LARSON. Yes.

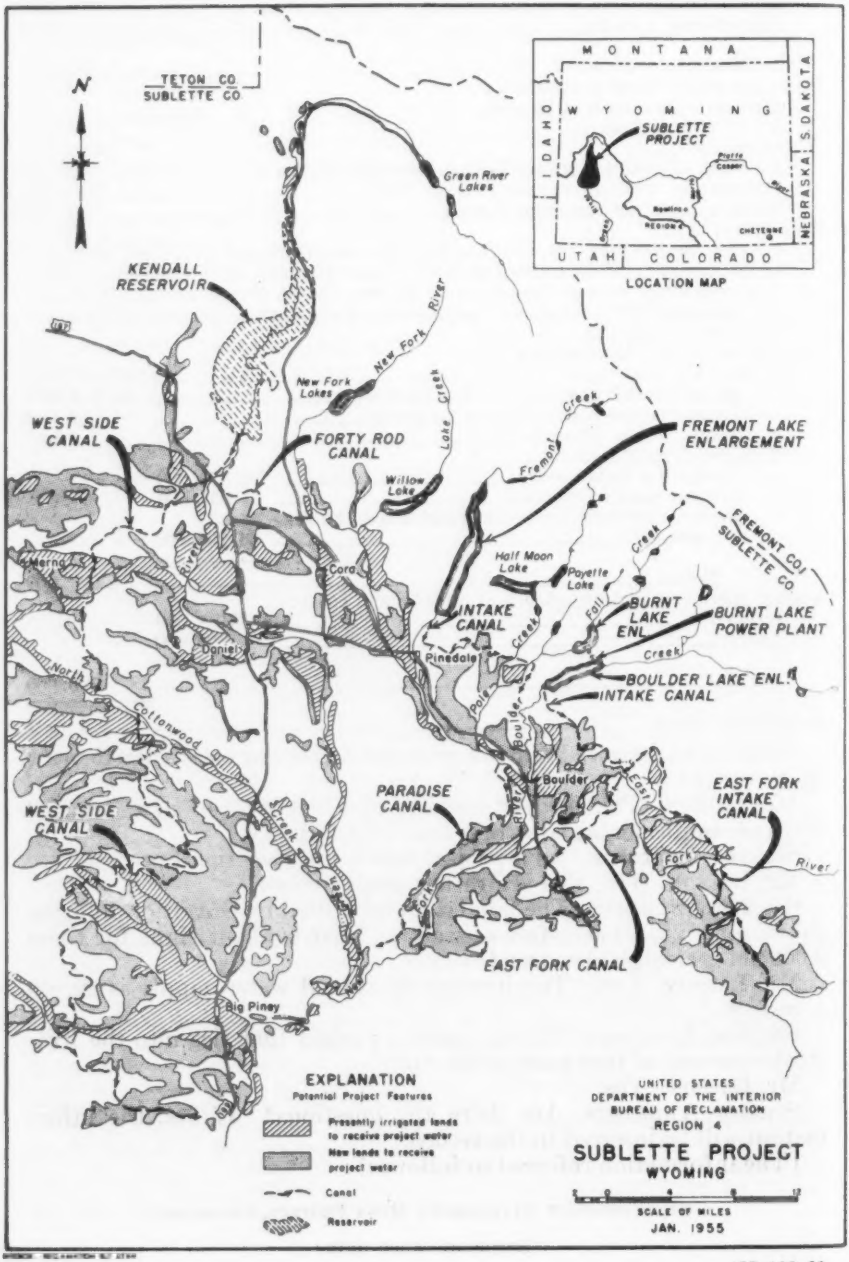
Senator ANDERSON. Are there any questions? If not, the information will be inserted in the record.

(The information referred to follows:)

STATEMENT ON BATTLEMENT MESA PROJECT, COLORADO

(Reconnaissance data)

The potential Battlement Mesa project in Mesa County, west-central Colorado, would regulate the surplus runoff in Buzzard Creek of the upper Colorado River


N
TETON CO
SUBLETTE CO
MONTANA
WYOMING
IDAHO
NEBRASKA
S.DAKOTA
UTAH
COLORADO
SUBLETTE PROJECT
REGION 4
CHEYENNE
LOCATION MAP
Green River Lakes
KENDALL RESERVOIR
New Fork River
New Fork Lakes
Lake Creek
WEST SIDE CANAL
FORTY ROD CANAL
Willow Lake
Fremont Creek
FREMONT LAKE ENLARGEMENT
FREMONT CO.
SUBLETTE CO
Half Moon Lake
Payette Lake
Fall Creek
BURNT LAKE ENL.
BURNT LAKE POWER PLANT
INTAKE CANAL
Pinedale
Cora
Daniel
Marna
North Cottonwood Creek
BOULDER LAKE ENL. INTAKE CANAL
Boulder Creek
Boulder Lake
East Fork River
EAST FORK INTAKE CANAL
PARADISE CANAL
WEST SIDE CANAL
EAST FORK CANAL
Big Piney
EXPLANATION
Potential Project Features
Presently irrigated lands to receive project water
New lands to receive project water
Canal
Reservoir
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF REALAMATION
REGION 4
SUBLETTE PROJECT
WYOMING
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152-400-59

drainage and 2 branches of Muddy Creek of the Gunnison River drainage to provide for the irrigation of 6,780 acres of full service land and 50 acres of supplemental service land located on the south slope of Battlement Mesa near the town of Collbran, Colo. The project would also aid in fish and wildlife conservation.

Climatological conditions prevailing in the project area would probably limit crop production to livestock feeds, such as alfalfa, small grains, and pasture. The principal type of farming after project development would be based on the ranging and feeding of livestock.

Principal construction features of the project would include the Owens Creek Dam and Reservoir on Buzzard Creek with a total capacity of 25,000 acre-feet, the Dyke Creek feeder canal which would divert surplus flows in Dyke and West Muddy Creek of the Gunnison River Basin into the channel of Buzzard Creek, and the Colorado Canal which would divert the reservoir releases from Buzzard Creek about 18 miles downstream from the Owens Creek Reservoir and convey the releases to the project lands. About 3 years would be required for construction of the project features.

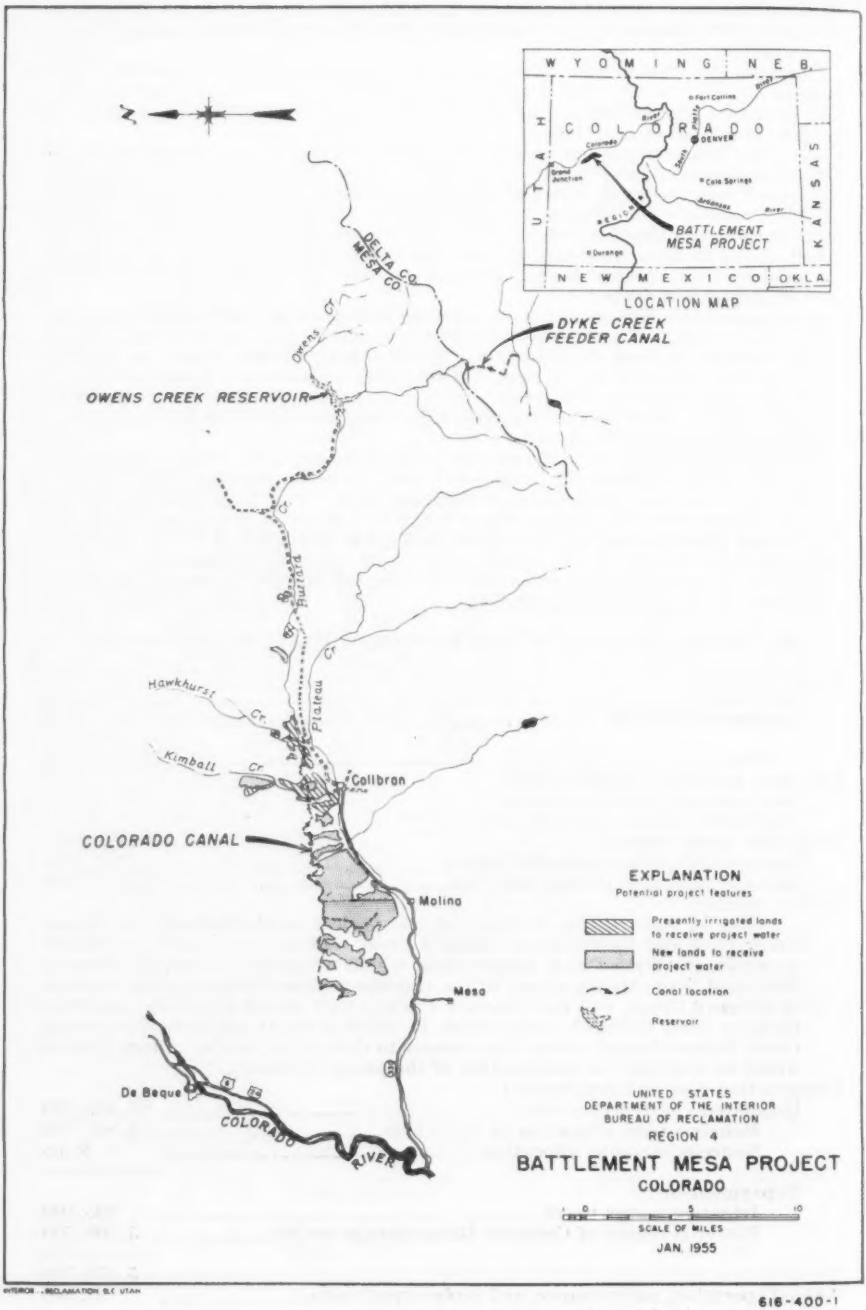
Reconnaissance land classification surveys indicate that the project lands are suitable for sustained crop production under irrigation farming but confirmation would require detailed classification. Water-supply studies, based on stream-flows as they occurred in the past, indicate that an adequate irrigation supply would be available for the project with permissible shortages in occasional drought years. Water rights for the project could probably be obtained under provisions of Colorado State law.

This statement is based on the physical plan of development for the Battlement Mesa unit of the Cliffs-Divide project as presented in the Bureau of Reclamation status report on that project, dated February 1954. The investigations leading to that report were of reconnaissance scope and detailed investigations of the Battlement Mesa project may show the need for modification of the development plans in order to provide the greatest degree of economic justification.

Results of reconnaissance estimates reflecting October 1954 construction prices are shown in the attached tabulation.

SUMMARY RECONNAISSANCE DATA, BATTLEMENT MESA PROJECT, COLORADO

Irrigated acreage:	*Acres*
New land	6,780
Supplemented land	50
Total	6,830
Principal agricultural production:	
Hay, pasture, and small grains.	
Beef cattle, sheep, and dairy cows.	
Irrigation water supply:	*Acre-feet*
Increase in annual irrigation supply	22,800
Increase in annual stream depletion	10,700
Project works:	
Principal construction features of the project would include the Owens Creek Dam and Reservoir on Buzzard Creek with a total capacity of 25,000 acre-feet, the Dyke Creek feeder canal which would divert surplus flows in Dyke and West Muddy Creek of the Gunnison River Basin into the channel of Buzzard Creek, and the Colorado Canal which would divert the reservoir releases from Buzzard Creek about 18 miles downstream from the Owens Creek Reservoir and convey the releases to the project lands. About 3 years would be required for construction of the project features.	
Construction cost and repayment:	
Estimated construction cost	$5,853,700
Reimbursable allocation to irrigation	5,853,700
Nonreimbursable allocation	None
Repayment by:	
Irrigation water users	645,000
Power revenues of Colorado River storage project	5,208,700
	5,853,700
Annual operation, maintenance, and replacement costs	21,300
Benefit-cost ratio, 1.1 to 1.	



INTERIOR - RECLAMATION SLC UTAH

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Senator ANDERSON. Will you turn to the Bluestone project?

Mr. LARSON. The Bluestone project in Colorado consists of 8,660 acres of new land, and 2,215 acres of supplemental land, or a total of 10,875 acres. It would be used primarily for the raising of alfalfa, grain, vegetables, fruit, sugar beets, and beef cattle, sheep, and dairy cows, which are important in the area.

Senator ANDERSON. This has a rather high benefit-cost ratio.

Mr. LARSON. Yes: a benefit-cost ratio of 2 to 1.

Senator ANDERSON. Are there any questions? If not, the statement will be inserted in the record at this point.

(The information referred to follows:)

STATEMENT ON BLUESTONE PROJECT, COLORADO

(Reconnaissance data)

The potential Bluestone project in Garfield and Mesa Counties, west-central Colorado, would divert water from Colorado River to provide for the irrigation of 8,660 acres of new land and 2,215 acres of supplemental service land located in the Colorado River Valley between the town of Rifle and the head of DeBeque Canyon near DeBeque, Colo.

The principal land use on irrigated farms under present conditions is confined to the production of hay, grain, pasture, and alfalfa seed crops. With project development it is anticipated the cropping pattern would be expanded to include potatoes, sugar beets, and fruit. Livestock feeding during the winter months would continue in the area.

Principal construction features of the project would include 2 diversion dams on the Colorado River, 1 at the heading of the Havemeyer Canal near Rifle, and the other at the heading of the Bluestone ditch near DeBeque; the complete restoration, enlargement, and extension of the Havemeyer Canal system; the Webster Hill pumping plant and lateral branching from the Havemeyer Canal about 5 miles below its heading; the Monument lateral branching from the Havemeyer Canal near Grand Valley; and rehabilitation of the Bluestone ditch. One to two years would be required for construction of the project features.

Reconnaissance land classification surveys indicate that the project lands are suitable for sustained crop production under irrigation farming but confirmation would require detailed classification. Water-supply studies, based on records of streamflows as they have occurred in the past, indicate that an adequate irrigation supply would be available at all times for the project by virtue of absolute decrees to the Havemeyer and Bluestone irrigation systems. Operation of the project as tentatively planned would depend on court approval of expansion of the irrigated acreage under these two systems.

This statement is based on the physical plan of development for the Bluestone unit of the Cliffs-Divide project as presented in the Bureau of Reclamation status report on that project, dated February 1954. The Cliffs-Divide status report is of reconnaissance scope and detailed investigations of the various features presented therein may show the need for modification of the development plans in order to provide the greatest degree of economic justification.

Results of reconnaissance estimates reflecting October 1954 construction prices are shown in the attached tabulation.

Summary reconnaissance data, Bluestone project, Colorado

Irrigated acreage:	*Acres*
New land	8,660
Supplemental land	2,215
Total	10,875
Principal agricultural production:	
Alfalfa, grain, vegetables, fruit, and sugar beets.	
Beef cattle, sheep, and dairy cows.	
Irrigation water supply:	*Acre-feet*
Increase in annual irrigation supply	42,900
Increase in annual stream depletion	19,900
Project works:	
Principal construction features of the project would include 2 diversion dams on the Colorado River, 1 at the heading of the Havemeyer Canal near Rifle and the other at the heading of the Bluestone ditch near DeBeque; the complete restoration, enlargement, and extension of the Havemeyer Canal system; the Webster Hill pumping plant and lateral branching from the Havemeyer Canal about 5 miles below its heading; the Monument lateral branching from the Havemeyer Canal near Grand Valley; and rehabilitation of the Bluestone ditch. One to two years would be required for construction of the project features.	
Construction cost and repayment:	
Estimated construction cost	$3,329,900
Reimbursable allocation to irrigation	3,329,900
Nonreimbursable allocation	None
Repayment by:	
Irrigation water users	370,000
Power revenues of Colorado River Storage project	2,959,900
Total	3,329,900
Annual operation, maintenance, and replacement costs	32,900
Benefit-cost ratio, 2 to 1.	

Senator ANDERSON. Will you give us a statement on the next project?

Mr. LARSON. The Bostwick Park project consists of 1,040 acres of new land, 5,830 acres of supplemental land, or a total of 6,870 acres. The land is to be used mostly for hay and pasture and raising of beef cattle and sheep.

It has a benefit-cost ratio of 2 to 1.

Senator ANDERSON. This is a very high elevation also, is it not?

Mr. LARSON. That is correct.

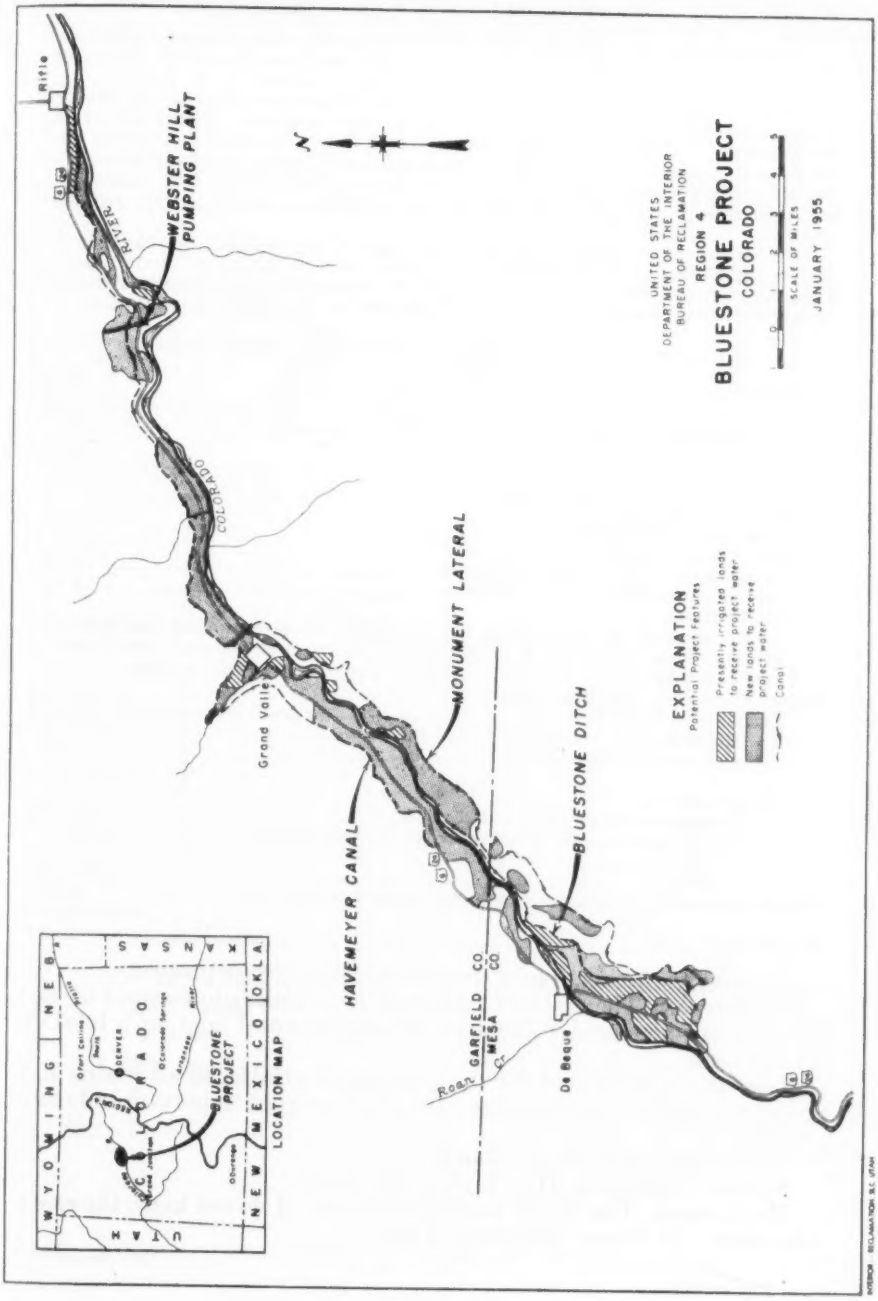
Senator ANDERSON. Are there any questions on the Bostwick Park project. If not, the statement will be inserted in the record.

(The information referred to follows:)

STATEMENT ON BOSTWICK PARK PROJECT, COLORADO

(Reconnaissance data)

The potential Bostwick Park project would provide a water supply for 1,040 acres of arable nonirrigated lands and supplemental water for 5,830 acres of presently irrigated lands. The lands are located along the west side of Cimarron Creek below the existing Cimarron Canal and in Bostwick and Shin Parks which lie about 10 miles east of the city of Montrose and also obtain their water supply through the Cimarron Canal. The source of the water supply for the project would be Cimarron Creek, a tributary of Gunnison River in the upper Colorado River Basin.


WEBSTER HILL PUMPING PLANT
RIVERSIDE
Rifle
COLORADO
Grand Valley
HAVEMEYER CANAL
MONUMENT LATERAL
BLUESTONE DITCH
GARFIELD CO
MESA CO
Roan Cr.
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N
EXPLANATION
Potential Project Features
Presently irrigated lands to receive project water
New lands to receive project water
Canal
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
REGION 4
BLUESTONE PROJECT
COLORADO
SCALE OF MILES
JANUARY 1955
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LOCATION MAP
BLUESTONE PROJECT
WYOMING
NEBR.
COLORADO
UTAH
NEW MEXICO
OKLA.
Denver
Colorado Springs
Durango

Development of the project would require construction of the potential 9,000-acre-foot Silver Jack Reservoir on Cimarron Creek and rehabilitation and extension of the existing Cimarron Canal and lateral system.

The present agricultural economy of the lands in the project is based principally upon dairying and the production of cash crops and farm livestock. No change in the type of farming is expected following development of the project.

The plan of development has been formulated through consideration of physical limitations and does not necessarily define the economic limitations of the development. A more detailed investigation may, therefore, indicate that changes in the plan are desirable. Cost estimates, water supply studies, land classification surveys, and agricultural economic studies have been made on a reconnaissance basis and may also require alterations during future planning work.

This statement is based on the physical plan of development presented in the Bureau of Reclamation reconnaissance report entitled "Gunnison River Project, Colorado," dated February 1951. Results of reconnaissance estimates reflecting October 1954 construction prices are summarized in the attached tabulation.

Summary reconnaissance data, Bostwick Park project, Colorado

Irrigated acreage:	*Acres*
New land	1,040
Supplemental land	5,830
Total	6,870
Principal agricultural production:	
Hay and pasture.	
Beef cattle and sheep.	
Irrigation water supply:	*Acre-feet*
Increase in annual irrigation supply	13,400
Increase in annual stream depletion	4,800
Project works:	
Development of the project would require construction of the potential 9,000-acre-foot Silver Jack Reservoir on Cimarron Creek and rehabilitation and extension of the existing Cimarron canal and lateral system.	
Construction costs and repayment:	
Estimated construction cost	$2,634,000
Reimbursable allocation to irrigation	2,634,000
Nonreimbursable allocation	None
Repayment by:	
Irrigation water users	695,000
Power revenues of Colorado River storage project	1,939,000
Total	2,634,000
Annual operation, maintenance, and replacement costs	10,200
Benefit-cost ratio	2 to 1

Senator ANDERSON. Let us have the Dallas Creek project.

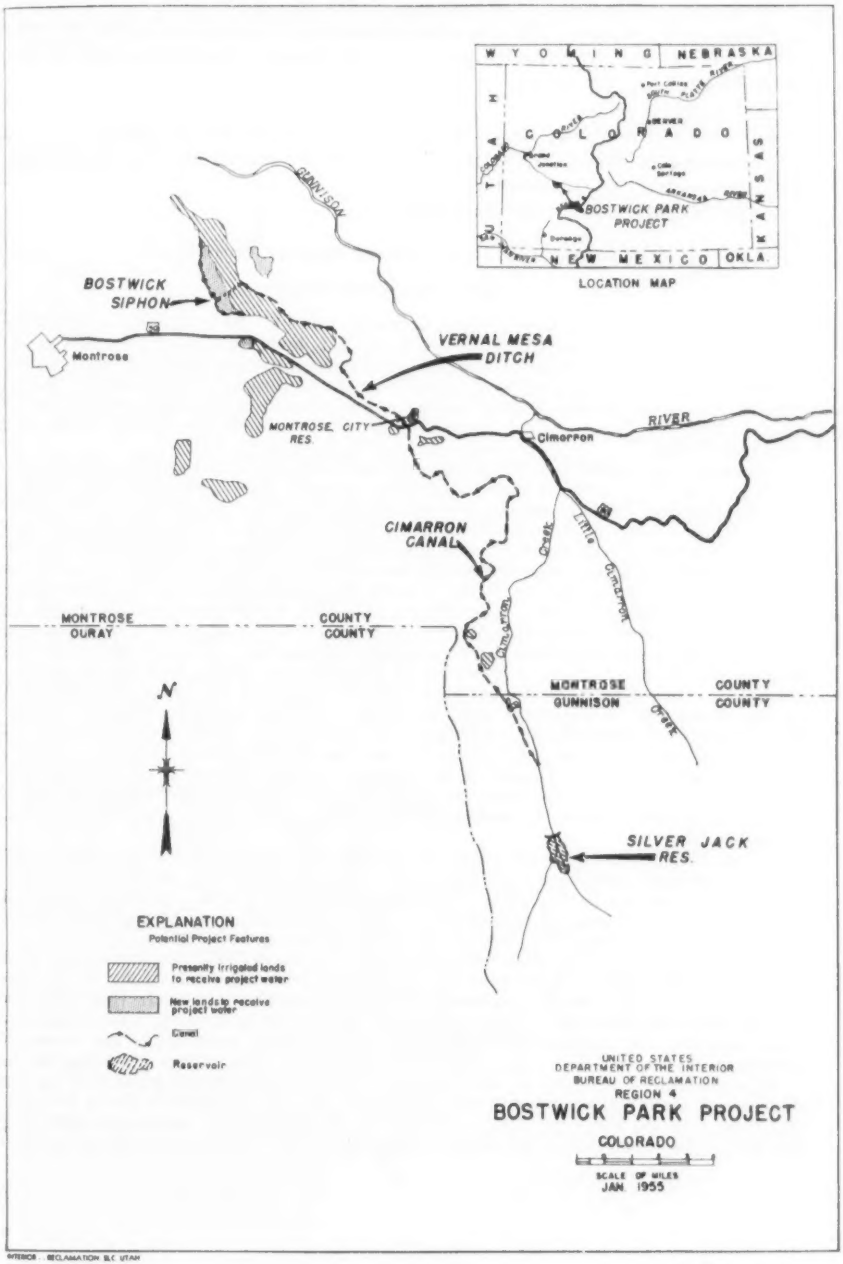
Mr. LARSON. The Dallas Creek project in Colorado consists of 15,750 acres of new land, 6,190 acres of supplemental land, or a total of 21,940 acres.

The land is to be used for the growing of alfalfa, small grains and pasture, with beef cattle, dairy cows, and sheep an important industry in the area.

The benefit-cost ratio is 1.6 to 1.

Senator ANDERSON. How high is this land?

Mr. LARSON. That is not too high an area. I do not know the exact elevation. It is near Ridgeway, Colo.



INTERIOR - RECLAMATION SLC UTAH

496-400-20

Senator ANDERSON. It is pretty high there generally.

Governor JOHNSON. It is between 5,000 and 6,000 feet.

Senator ANDERSON. So the development of the land is again a contributing factor in the development of the sheep industry as well as the beef-cattle industry there.

Mr. LARSON. Yes.

Governor JOHNSON. It is a beef and sheep industry country.

Senator ANDERSON. If there are no further questions, the statement will be inserted in the record.

(The statement referred to follows:)

STATEMENT ON DALLAS CREEK PROJECT, COLORADO

(Reconnaissance data)

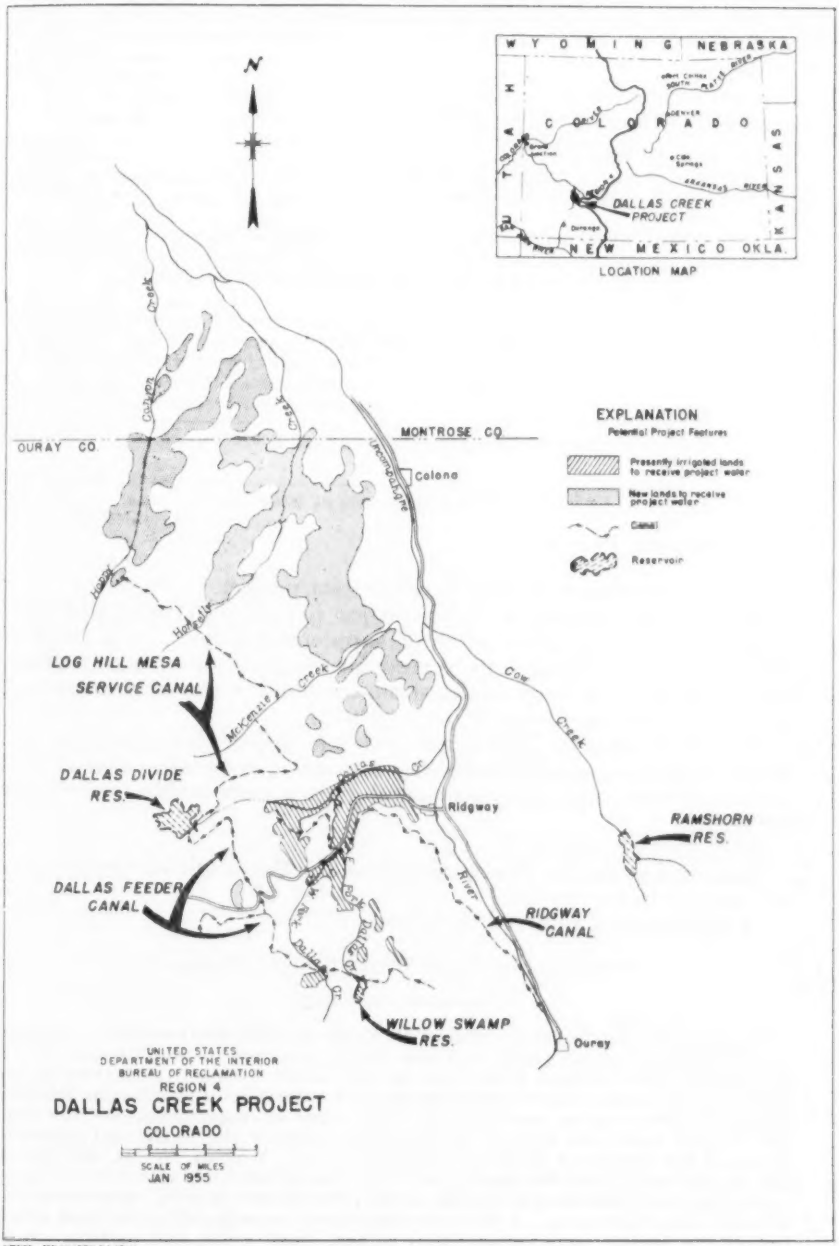
The potential Dallas Creek project would provide an irrigation supply for 15,750 acres of arable nonirrigated lands and supplemental water for 6,190 acres of irrigated lands. The lands are located in the drainage basin of the Uncompahgre River, a tributary of Gunnison River in the upper Colorado River Basin. The water supply for the project would be made available through utilization of surplus flows of Uncompahgre River and two of its tributaries, Dallas Creek and and Cow Creek.

Construction features of the project would consist of three storage reservoirs, a water collection system, and two service canals. The 5,000-acre-foot Willow Swamp Reservoir would be constructed on East Dallas Creek and would store flows of that stream in addition to diversions through a 4-mile section of the collection system from Beaver Creek, a tributary of Dallas Creek. From Willow Swamp Reservoir, the collection canal would continue a distance of 16 miles to the potential 11,200-acre-foot Dallas Divide Reservoir, located on another small tributary of Dallas Creek. The 19-mile Log Hill Mesa Canal would begin at Dallas Divide Reservoir and would supply lands on Log Hill Mesa, a high plateau west of Uncompahgre River. The potential Ridgeway Canal would head on Uncompahgre River about 2 miles below the town of Ouray and would convey water 18 miles to lands on lower Dallas Creek. Some of the water to be used on lands of the unit is presently used by lands lower on the Uncompahgre River. Replacement storage would, therefore, be necessary. Such storage could be constructed at either the Ramshorn site on Cow Creek of the Ridgeway site on Uncompahgre River. Although it is assumed in this statement that the Ramshorn Reservoir would be constructed to provide replacement storage, further studies will be necessary to definitely determine which of the two sites should be selected.

Present agricultural development in the area is based on the production of alfalfa, pasture, and small grains which support dairy and beef cattle enterprises. No change in the type of farming on existing farm units is expected following development of the project. New farm units to be brought under irrigation will probably be devoted to dairying and general farming.

The plan of development has been formulated through consideration of physical limitations and does not necessarily define the economic limitations of the development. A more detailed investigation may, therefore, indicate that changes in the plan are desirable. Cost estimates, water supply studies, land classification surveys, and agricultural economic studies have been made on a reconnaissance basis and may also require alterations during future planning work.

This statement is based on the physical plan of development presented in the Bureau of Reclamation reconnaissance report entitled "Gunnison River Project, Colorado," dated February 1951. Results of reconnaissance estimates reflecting October 1954 construction prices are summarized in the attached tabulation.



INTERIOR - RECLAMATION SLC UTAH

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Summary reconnaissance data, Dallas Creek Project, Colorado

Irrigated acreage:	*Acres*
New land	15,750
Supplemental land	6,190
Total	21,940
Principal agricultural production:	
Alfalfa, small grains, and pasture.	
Beef cattle, dairy cows, and sheep.	
Irrigation water supply:	*Acre-feet*
Increase in annual irrigation supply	62,500
Increase in annual stream depletion	29,900
Project works:	
Principal construction features would include 3 reservoirs with a total storage capacity in excess of 40,000 acre-feet, a system of canals for collecting water from several streams, and 2 main water delivery canals.	
Construction cost and repayment:	
Estimated construction cost	$10,330,000
Reimbursable allocation to irrigation	10,330,000
Nonreimbursable allocation	None
Repayment by:	
Irrigation water users	950,000
Power revenues of Colorado River storage project	9,380,000
Total	10,330,000
Annual operation, maintenance, and replacement costs	37,800

Benefit-cost ratio, 1.6 to 1.

Senator ANDERSON. Let us have the next project.

Mr. LARSON. The Eagle Divide project in Colorado consists of 8,990 acres of new land, 1,885 acres of supplemental land, or a total of 10,875 acres. The land is to be used for the growing of hay, pasture, small grains, with beef cattle, sheep, and dairy cows an important industry. The benefit-cost ratio is 1.1 to 1.

Senator ANDERSON. But again this is a project that would be valuable to the surrounding economy because it does take care of beef cattle and sheep and dairy cows, and gives a more stable feed supply for them.

Mr. LARSON. Yes.

Senator ANDERSON. The statement on the Eagle Divide project may be inserted in the record.

(The statement referred to follows:)

STATEMENT ON EAGLE DIVIDE PROJECT, COLORADO

(Reconnaissance data)

The potential Eagle Divide project in Eagle County, northwestern Colorado, would regulate surplus runoff in Piney River, tributary to the Colorado River, and would divert surplus flows from several small streams, tributaries to the Piney and Colorado Rivers below the planned reservoir, to provide for the irrigation of 8,990 acres of new land and 1,885 acres of supplemental service land. The project lands are located on the divide between the Eagle and Colorado Rivers in the vicinity of the following towns: Eagle, Wolcott, McCoy, and Burns. The project would increase fishery, wildlife, and recreational values of the area.

Ranging and feeding of livestock is the predominant type of agriculture followed in the project area. A short growing season, resulting from the high elevation of the project lands, limits crops to hay, small grain, and pasture. It is anticipated that continued production of these crops would prevail with project development. Most of the crops produced would be locally fed to livestock.

Principal construction features of the project would include the Red Sandstone Dam and Reservoir on Piney River with a total capacity of 12,800 acre-feet; the Catamount Canal extending eastward about 32 miles from Piney River below the reservoir along the Eagle-Colorado Divide to Catamount Creek, tributary to the Colorado River near Burns; and the Willow Creek lateral, a branch of the Catamount Canal which would serve lands in the Willow Creek and Little Alkali Creek drainages that are tributaries to Eagle River near Wolcott. About 3 years would be required for construction of the project features.

Reconnaissance land-classification surveys indicate that the project lands are suitable for sustained crop production under irrigation farming, but confirmation would require detailed classification. Water-supply studies based on streamflows as they occurred in the past indicate that an adequate irrigation supply would be available for the project with permissible shortages in occasional drought years. Water rights for the project could probably be obtained under provisions of Colorado State law.

This statement is based on the physical plan of development for the Eagle Divide unit of the Cliffs-Divide project as presented in the Bureau of Reclamation status report on that project dated February 1954. The investigations leading to that report were of reconnaissance scope and detailed investigations of the Eagle Divide project may show the need for modification of the development plans in order to provide the greatest degree of economic justification.

Results of reconnaissance estimates reflecting October 1954 construction prices are shown in the attached tabulation.

Summary reconnaissance data, Eagle Divide project, Colorado

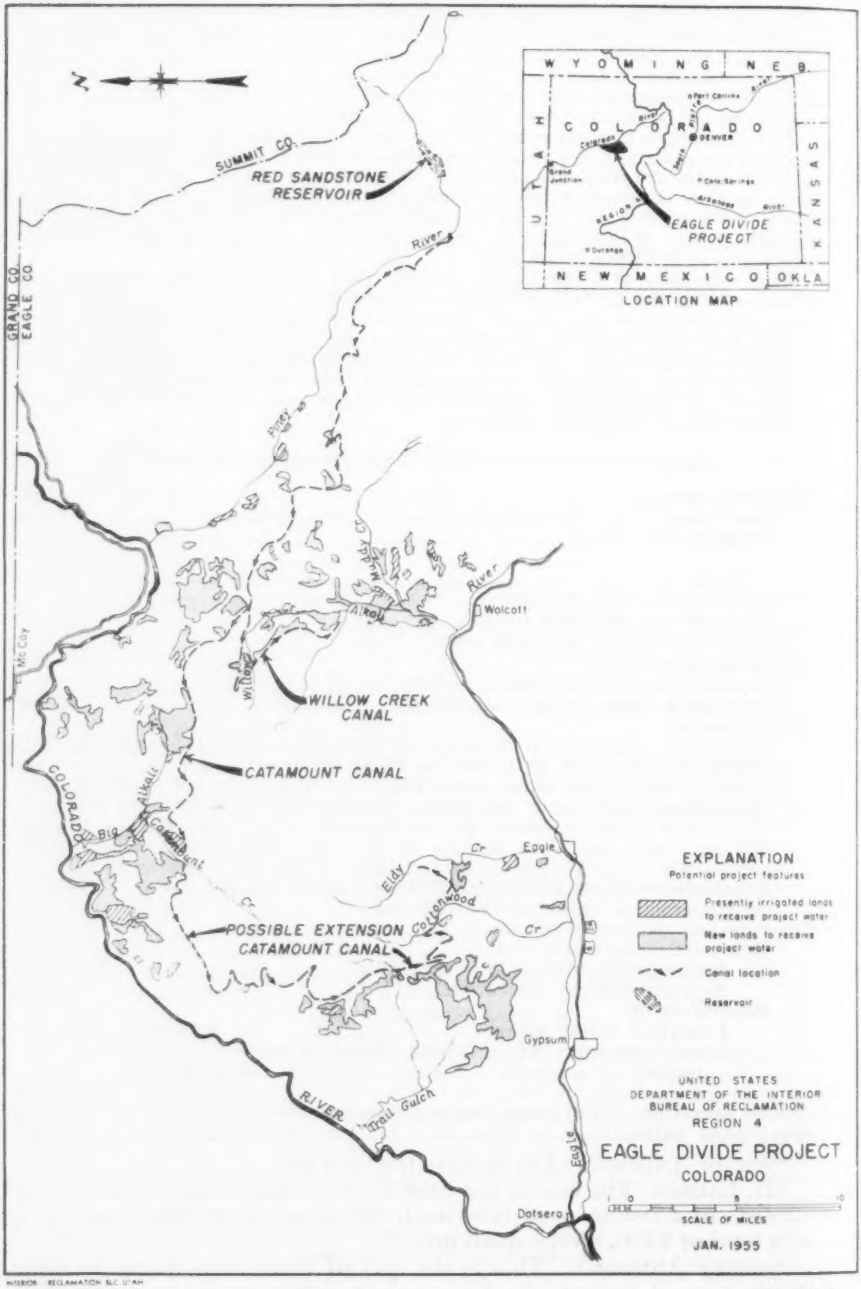
Irrigated acreage:		*Acres*
New land		8,990
Supplemental land		1,885
Total		10,875
Principal agricultural production:		
Hay, pasture, and small grains.		
Beef cattle, sheep, and dairy cows.		
Irrigation water supply:		*Acre-feet*
Increase in annual irrigation supply		23,900
Increase in annual stream depletion		12,000
Project works:		
Principal construction features of the project would include the Red Sandstone Dam and Reservoir on Piney River with a total capacity of 12,800 acre-feet; the Catamount Canal extending eastward about 32 miles from Piney River below the reservoir along the Eagle-Colorado Divide to Catamount Creek, tributary to the Colorado River near Burns; and the Willow Creek lateral, a branch of the Catamount Canal which would serve lands in the Willow Creek and Little Alkali Creek drainages that are tributaries to Eagle River near Wolcott. About 3 years would be required for construction of the project features.		
Construction cost and repayment:		
Estimated construction cost		$3,411,700
Reimbursable allocation to irrigation		3,411,700
Nonreimbursable allocation		None
Repayment by:		
Irrigation water users	$305,000	
Power revenues of Colorado River storage project	3,106,700	
		3,411,700
Annual operation, maintenance, and replacement costs		15,400
Benefit-cost ratio		1.1 to 1

Senator ANDERSON. Let us have the next one.

Mr. LARSON. The next is the East River project in Colorado. That consists of 1,780 acres of new land, 970 acres of supplemental land, or a total of 2,750, a very small unit.

Senator ANDERSON. This is the sort of thing that might be done under a small waterworks plan, and therefore would be using some of the water of the Colorado River.

Mr. LARSON. That is right.


N
SUMMIT CO.
RED SANDSTONE RESERVOIR
GRAND CO.
EAGLE CO.
River
Piney
McCoy
Wilder
Wilder
Alkali
Alkali
River
Wolcott
WILLOW CREEK CANAL
CATAMOUNT CANAL
COLORADO
Big
Alkali
Cr
Eagle
Eldy
Cottonwood
Cr
POSSIBLE EXTENSION CATAMOUNT CANAL
Gypsum
RIVER
Trail Gulch
Eagle
Dotsero
WYOMING
NEB.
COLORADO
DENVER
KANSAS
NEW MEXICO
OKLA
UTAH
Grand Junction
Colorado
Arkansas
EAGLE DIVIDE PROJECT
LOCATION MAP
EXPLANATION
Potential project features
Presently irrigated lands to receive project water
New lands to receive project water
Canal location
Reservoir
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
REGION 4
EAGLE DIVIDE PROJECT
COLORADO
SCALE OF MILES
JAN. 1955
INTERIOR - RECLAMATION SLC UTAH
616-400-3

Senator ANDERSON. But since that bill is not ready as yet, you must do something toward the development of this area. This is clear down in the far-corner section; is it not?

Mr. LARSON. Yes. In the preparation of our reconnaissance report, it is our purpose to cover any projects or units that might be worthy of detailed investigation.

Senator ANDERSON. Even though small, these projects are important, are they not, in what they do to the surrounding country?

Mr. LARSON. Yes, sir.

Senator ANDERSON. We will insert that statement in the record.

(The statement referred to follows:)

STATEMENT ON EAST RIVER PROJECT, COLORADO

(Reconnaissance data)

Development of the potential East River project would provide for irrigation of 1,780 acres of nonirrigated lands and would provide supplemental water for 970 acres of presently irrigated lands north of the town of Gunnison in the upper Colorado River Basin. The water would be made available through construction of the 5-mile East River Canal which would divert from East River, one of the upper tributaries of Gunnison River. No storage facilities would be required to provide an adequate water supply for lands of the project.

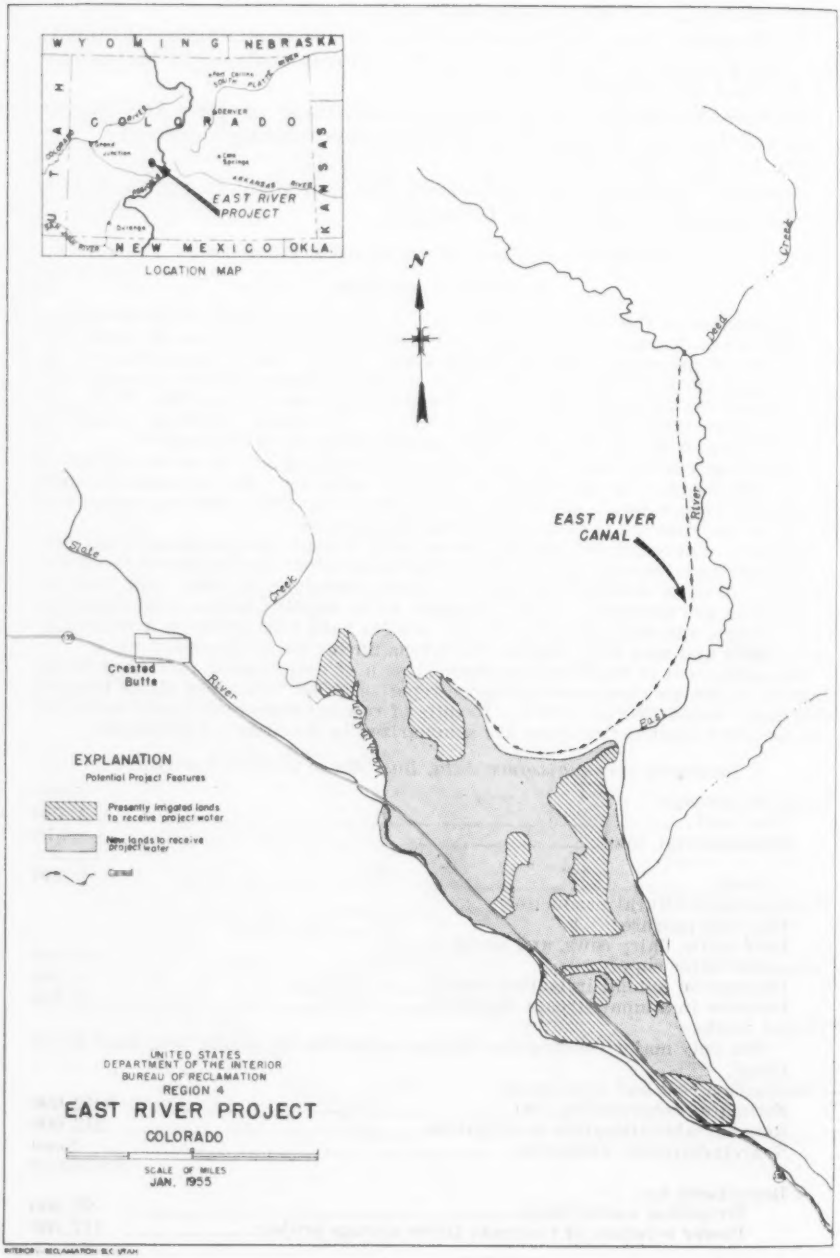
Present agricultural development in the area is limited largely to the production of hay and pasture for the dominant livestock industry. The cropping program of lands of the project is controlled principally by the short growing season and would not be expected to change following development.

The plan of development has been formulated through consideration of physical limitations and does not necessarily define the economic limitations of the development. A more detailed investigation may, therefore, indicate that changes in the plan are desirable. Cost estimates, water-supply studies, land-classification surveys, and agricultural economic studies have been made on a reconnaissance basis and may also require alterations during future planning work.

This statement is based on the physical plan of development presented in the Bureau of Reclamation reconnaissance report entitled "Gunnison River Project, Colorado," dated February 1951. Results of reconnaissance estimates reflecting October 1954 construction costs are summarized in the attached tabulation.

Summary reconnaissance data, East River project, Colorado

Irrigated acreage:	*Acres*
New land	1,780
Supplemental land	970
Total	2,750
Principal agricultural production:	
Hay and pasture.	
Beef cattle, dairy cows, and sheep.	
Irrigation water supply:	*Acre-feet*
Increase in annual irrigation supply	8,500
Increase in annual stream depletion	2,100
Project works:	
The only major construction feature would be the 5-mile long East River Canal.	
Construction cost and repayment:	
Estimated construction cost	$212,000
Reimbursable allocation to irrigation	212,000
Nonreimbursable allocation	None
Repayment by:	
Irrigation water users	95,000
Power revenues of Colorado River storage project	117,000
Total	212,000
Annual operation, maintenance, and replacement costs	2,800
Benefit cost ratio	3 to 1


WYOMING NEBRASKA
COLORADO
UTAH
KANSAS
NEW MEXICO OKLA.
EAST RIVER PROJECT
LOCATION MAP
N
EAST RIVER CANAL
Slate Creek
Crested Butte
Gothic
East River
Peel Creek
EXPLANATION
Potential Project Features
Presently irrigated lands to receive project water
New lands to receive project water
Canal
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
REGION 4
EAST RIVER PROJECT
COLORADO
SCALE OF MILES
JAN. 1955
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496-400-17

Senator ANDERSON. Let us pass on to the next one.

Mr. LARSON. The Fruitland Mesa project in Colorado consists of 11,700 acres of new land, 7,700 acres of supplemental land, or a total of 19,400 acres.

The lands are to be used for the growing of hay, pasture, and small grains, with beef cattle, sheep, and dairy cows and important industry in the area.

Senator ANDERSON. It would not require colonization? New people would not have to move into the area in order to make use of this project because of the large amount of irrigated land which will get a supplemental supply?

Mr. LARSON. That is right.

Senator ANDERSON. The statement on Fruitland Mesa may be made part of the record.

(The statement referred to follows:)

STATEMENT ON FRUITLAND MESA PROJECT, COLORADO

(Reconnaissance data)

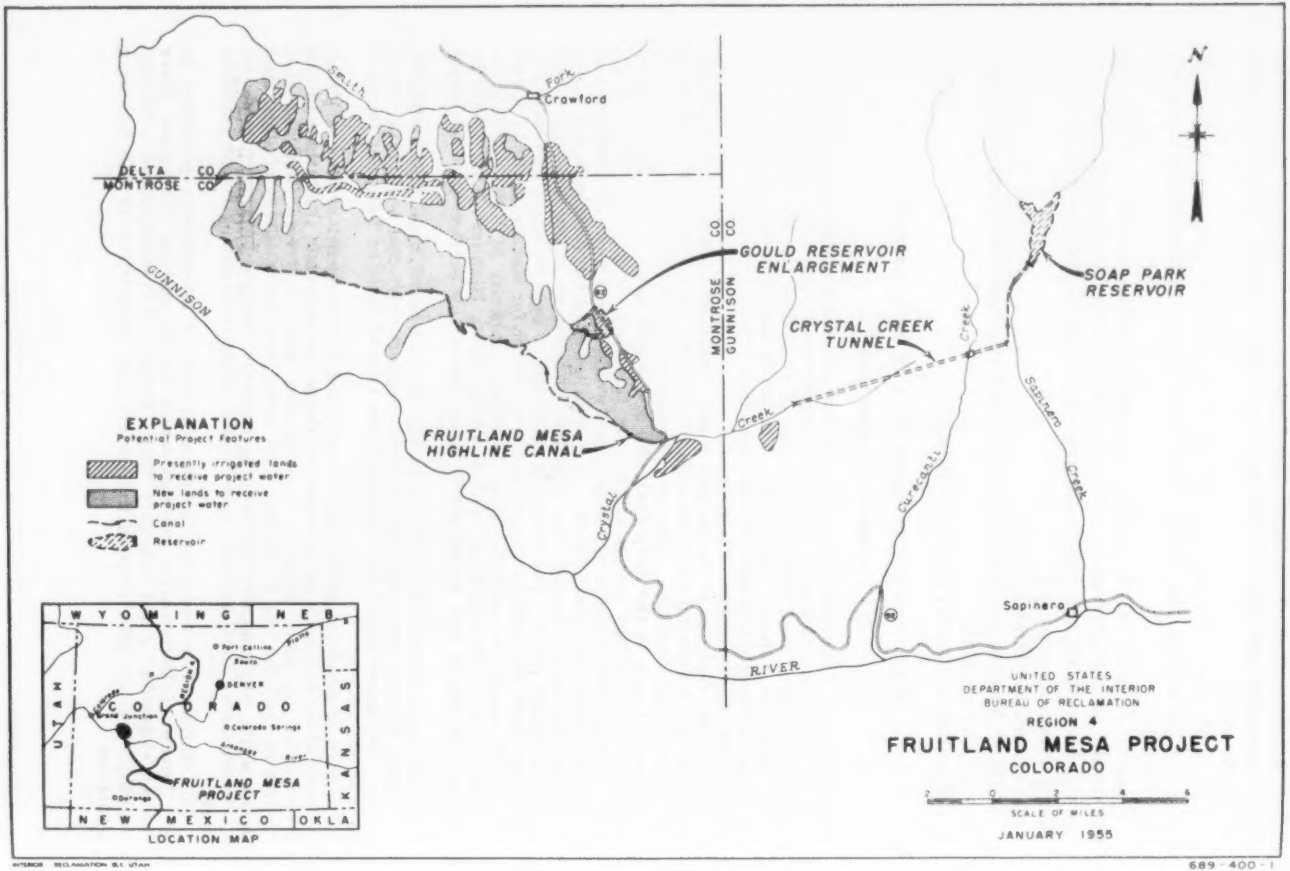
The potential Fruitland Mesa project would provide a water supply for 11,700 acres of arable nonirrigated land and supplemental water for 7,700 acres of presently irrigated land between the town of Crawford and the Black Canyon of the Gunnison National Monument. The water supply would be made available from Sapinero, Curecanti, Crystal, and Iron Creeks, tributaries of Gunnison River in the upper Colorado River Basin.

Construction features of the project would consist of a storage reservoir, enlargement of an existing reservoir, and construction of a system of waterways and distribution facilities. The new storage reservoir would be constructed on Sapinero Creek at the Soap Park site and would have a capacity of 25,000 acre-feet. A waterway system starting at the reservoir and consisting of 2.5 miles of bench flume and 7 miles of tunnel would divert flows of Sapinero and Curecanti Creeks to Crystal Creek. At a point lower on Crystal Creek, the water would be rediverted through the potential enlargement of the existing Gould Reservoir feeder canal. The feeder canal would be used to supply the potential Fruitland Mesa Highline Canal and to convey water for storage in Gould Reservoir which would be enlarged from its present capacity of 9,000 acre-feet to a capacity of 25,000 acre-feet. The Fruitland Mesa Highline Canal would be 14 miles in length and would serve lands above the service area of Gould Reservoir.

Present agricultural development in the area is based upon the production of alfalfa, pasture, and small grains which support dairy and beef cattle enterprises. No change would be expected in the type of farming following development of the project.

The plan of development has been formulated through consideration of physical limitations and does not necessarily define the economic limitations of the development. A more detailed investigation may, therefore, indicate that changes in the plan are desirable. Cost estimates, water supply studies, land classification surveys, and agricultural economic studies have been made on a reconnaissance basis and may also require alterations during future planning work.

This statement is based on the physical plan of development presented in the Bureau of Reclamation reconnaissance report entitled "Gunnison River Project, Colorado," dated February 1951. Results of reconnaissance estimates reflecting October 1954 construction prices are summarized in the following tabulation.


Smith Fork
Crawford
DELTA CO
MONTROSE CO
GUNNISON
CO
MONTROSE
GUNNISON CO
GOULD RESERVOIR ENLARGEMENT
SOAP PARK RESERVOIR
CRYSTAL CREEK TUNNEL
Creek
Crystal Creek
Curecanti Creek
Sapinero Creek
FRUITLAND MESA HIGHLINE CANAL
Sapinero
RIVER
N
EXPLANATION
Potential Project Features
Presently irrigated lands to receive project water
New lands to receive project water
Canal
Reservoir
WYOMING
NEB
UTAH
COLORADO
KANSAS
NEW MEXICO
OKLA
Denver
Colorado Springs
Grand Junction
Durango
FRUITLAND MESA PROJECT
LOCATION MAP
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
REGION 4
FRUITLAND MESA PROJECT
COLORADO
SCALE OF MILES
JANUARY 1955
689-400-1

Summary reconnaissance data, Fruitland Mesa project, Colorado

Irrigated acreage:	*Acres*
New land	11,700
Supplemental land	7,700
Total	19,400
Principal agricultural production:	
Hay, pasture, and small grains.	
Beef cattle, sheep, and dairy cows.	
Irrigation water supply:	*Acre-feet*
Increase in annual irrigation supply	57,200
Increase in annual stream depletion	25,100
Project works:	
Construction features of the project would consist of a storage reservoir, enlargement of an existing reservoir, and construction of a system of waterways and distribution facilities. The new storage reservoir would be constructed on Sapinero Creek at the Soap Park site and would have a capacity of 25,000 acre-feet. A waterway system starting at the reservoir and consisting of 2.5 miles of bench flume and 7 miles of tunnel would divert flows of Sapinero and Curecanti Creeks to Crystal Creek. At a point lower on Crystal Creek, the water would be rediverted through the potential enlargement of the existing Gould Reservoir feeder canal. The feeder canal would be used to supply the potential Fruitland Mesa Highline Canal and to convey water for storage in Gould Reservoir which would be enlarged from its present capacity of 9,000 acre-feet to a capacity of 25,000 acre-feet. The Fruitland Mesa Highline Canal would be 14 miles in length and would serve lands above the service area of Gould Reservoir.	
Construction costs and repayment:	
Estimated construction cost	$11,551,000
Reimbursable allocation to irrigation	11,551,000
Nonreimbursable allocation	None
Repayment by:	
Irrigation water users	1,060,000
Power revenues of Colorado River storage project	10,491,000
Total	11,551,000
Annual operation, maintenance, and replacement costs	26,000
Benefit cost ratio	1.3 to 1

Senator ANDERSON. Let us go to the next.

Mr. LARSON. Grand Mesa project consists of 11,070 acres of new land, 14,230 acres of supplemental land, or a total of 25,300 acres.

The lands are to be used for the growing of alfalfa, small grains, pastures, and fruit, with dairy cows, beef cattle, and sheep important.

Senator ANDERSON. This is one where it looks as though the irrigators' repayment of cost is pretty small.

Mr. LARSON. That is true on practically all of these projects. The average repayment of all water users is about 7.6 percent.

Senator ANDERSON. On this it looks only about a dollar and a quarter an acre.

Mr. LARSON. That is all for that one.

Senator ANDERSON. Yes. Unless you have some comment on it, we will insert the statement in the record at this point.

(The statement referred to follows:)

STATEMENT ON GRAND MESA PROJECT, COLORADO

(Reconnaissance data)

The potential Grand Mesa project would provide a water supply for 11,070 acres of arable nonirrigated land and supplemental water for 14,230 acres of irrigated land in the Gunnison River drainage of the upper Colorado River Basin. These acreages include nearly all of the lands along the south slope of Grand Mesa except lands included in the service areas of the potential Paonia project and the Fruitgrowers Dam project extension. The water supply for the project would be made available from Muddy Creek and other Grand Mesa tributaries of Gunnison River.

Construction features of the project would consist of two storage reservoirs, a feeder canal, a service canal, a pumping plant, and a system of laterals. The principal storage for the project would be provided on Muddy Creek at the Spring Creek site which is also planned to provide storage water for the Paonia project. Should the reservoir be constructed initially to a capacity of 18,000 acre-feet as required for the Paonia project, enlargement to a total capacity of 85,000 acre-feet would be necessary at the time the Grand Mesa project is constructed. At that time, a 3.5-mile feeder canal would also be constructed from Anthracite Creek to augment natural inflow to the reservoir. Cedaredge Canal would begin at Spring Creek Reservoir and would extend a distance of 67 miles in distributing water to lands of the project. The Redlands Mesa pumping plant, to be constructed on the canal near the Leroux Creek crossing, would deliver water to lands above the canal in the Redlands Mesa area. The potential 4,000-acre-foot Gorsuch Reservoir, located on Currant Creek 12 miles from the end of Cedaredge Canal, would regulate flows of the canal as well as Currant Creek.

The present agricultural economy of lands of the project is based on the production of fruit and general crops. The overall cropping program is determined largely by local air drainage and frost conditions during growing season. The type of farming is not expected to change following development of the project.

This statement is based on the physical plan of development presented in the Bureau of Reclamation reconnaissance report entitled "Gunnison River Project, Colorado," dated February 1951. Plan formulation, cost estimates, water supply studies, land classification surveys, and agricultural economic studies for the project have been made on a rough reconnaissance basis and may require extensive alterations during future planning work. The present supply for irrigated lands under the unit is derived from small Grand Mesa streams which are now highly developed as sources of water. In order for all lands included in the project to obtain adequate supplies of water, it would be necessary to transfer water now used on lands below the potential Cedaredge Canal to lands above the canal. In formulating the plan outlined in this statement, it was assumed that sufficient water could be made available to supply the higher lands. Should subsequent investigations prove this assumption to be erroneous, development of the project could be considerably less desirable economically than indicated by this statement.

Results of reconnaissance estimates reflecting October 1954 construction prices are summarized in the attached tabulation.

Summary reconnaissance data, Grand Mesa project, Colorado

Irrigated acreage:	*Acres*
New land	11,070
Supplemental land	14,230
Total	25,300
Principal agricultural production:	
Alfalfa, small grains, pasture, and fruit.	
Dairy cows, beef cattle, and sheep.	
Irrigation water supply:	*Acre-feet*
Increase in annual irrigation supply	59,100
Increase in annual stream depletion	26,300

Project works:

Construction features of the project would consist of two storage reservoirs, a feeder canal, a service canal, a pumping plant, and a system of laterals. The principal storage for the project would be provided on Muddy Creek at the Spring Creek site which is also planned to provide storage water for the Paonia project. Should the reservoir be constructed initially to a capacity of 18,000 acre-feet as required for the Paonia project, enlargement to a total capacity of 85,000 acre-feet would be necessary at the time the Grand Mesa project is constructed. At that time, a 3.5-mile feeder canal would also be constructed from Anthracite Creek to augment natural inflow to the reservoir. Cedaredge Canal would begin at Spring Creek Reservoir and would extend a distance of 67 miles in distributing water to lands of the project. The Redlands Mesa pumping plant, to be constructed on the canal near the Leroux Creek crossing, would deliver water to lands above the canal in the Redlands Mesa area. The potential 4,000-acre-foot Gorsuch Reservoir, located on Currant Creek 12 miles from the end of Cedaredge Canal, would regulate flows of the canal as well as Currant Creek.

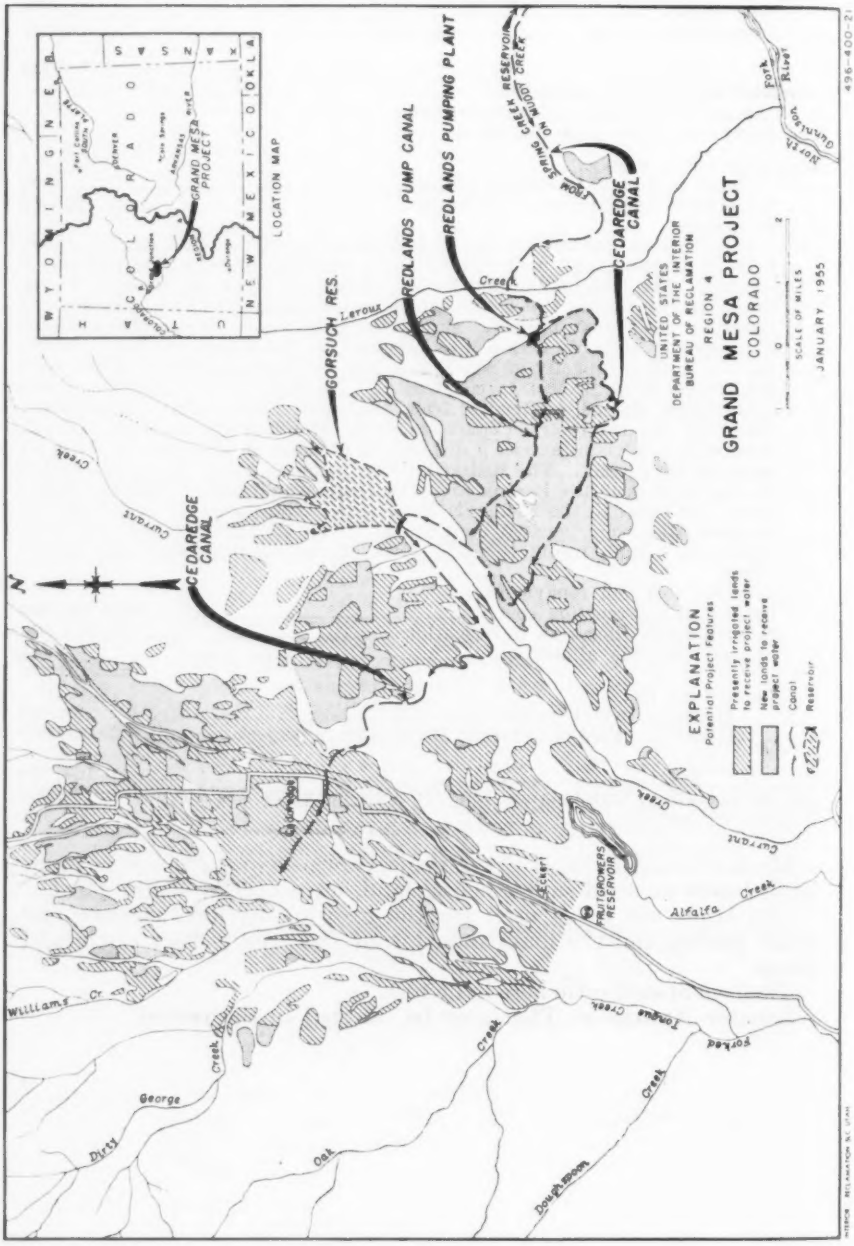
Construction cost and repayment:	
Estimated construction cost	$20,164,000
Reimbursable allocation to irrigation	20,164,000
Nonreimbursable allocation	None
Repayment by:	
Irrigation water users	30,000
Power revenues of Colorado River storage project	20,134,000
Total	20,164,000
Annual operation, maintenance, and replacement costs	132,000
Benefit-cost ratio	1.8 to 1

Mr. LARSON. The Ohio Creek project consists of 6,200 acres of new land, 10,710 acres of supplemental land, or a total of 16,910 acres.

The lands are to be used for the growing of hay, pasture and small grains, and the main industry of the area is beef cattle and sheep.

The benefit-cost ratio here is 1.5 to 1.

Senator ANDERSON. That may be inserted in the record.


GRAND MESA PROJECT
COLORADO
REGION 4
BUREAU OF RECLAMATION
DEPARTMENT OF THE INTERIOR
UNITED STATES
JANUARY 1955
SCALE OF MILES
EXPLANATION
Potential Project Features
Presently irrigated lands to receive project water
New lands to receive project water
Canal
Reservoir
LOCATION MAP
GRAND MESA PROJECT
CEDAREDGE CANAL
GORSUCH RES.
REDLANDS PUMP CANAL
REDLANDS PUMPING PLANT
SPRING CREEK RESERVOIR
SPRING CREEK
CEDAREDGE CANAL
FRUITGROWERS RESERVOIR
Alfalfa Creek
Tongue Creek
Dry Creek
Dry George Creek
Williams Cr
Curtant Creek
Gunnison River
North Fork Gunnison River
Leroux Creek
Creek
Cedaredge
Eckert
WYOMING
COLORADO
NEW MEXICO
OKLA
496-400-21

(The statement referred to follows:)

STATEMENT ON THE OHIO CREEK PROJECT, COLORADO

(Reconnaissance Data)

The potential Ohio Creek project would provide for the irrigation of 6,200 acres of arable nonirrigated land and 10,710 acres of irrigated land in need of additional water. The source of the water would be Ohio Creek, a Gunnison River tributary in the upper Colorado River Basin.

Construction features would consist of a storage reservoir, irrigation service canal, and a lateral system. The potential Castleton Reservoir would be constructed to a capacity of 10,000 acre-feet to provide regulatory storage for the project. The Castleton site is located on Castle Creek, a tributary of Ohio Creek. The Ohio Creek Canal, 18 miles in length, would deliver the irrigation water to lands of the project.

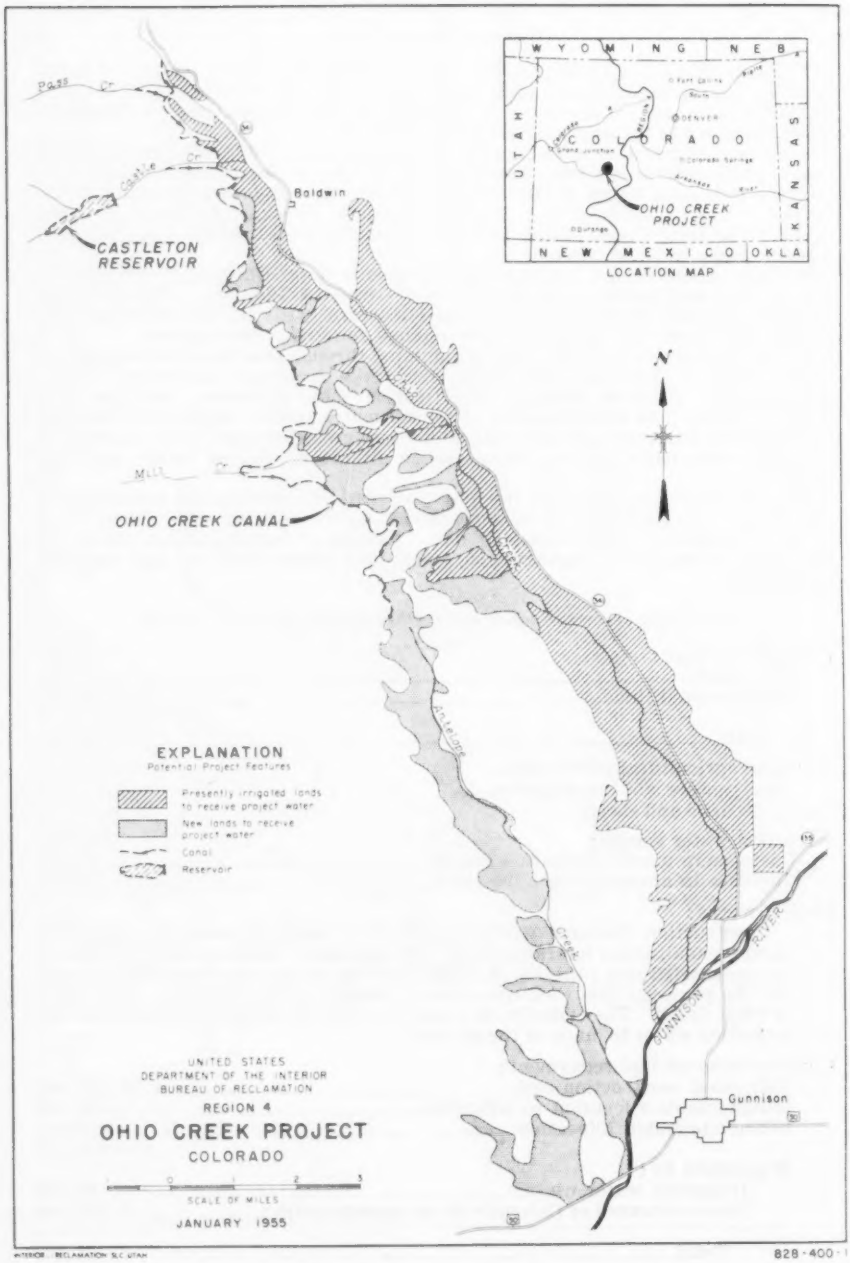
Present agricultural development in the area is limited largely to the production of hay and pasture for the dominant livestock industry. The cropping program of lands of the project is controlled principally by the short growing season and would not be expected to change following development.

The plan of development has been formulated through consideration of physical limitations and does not necessarily define the economic limitations of the development. A more detailed investigation may, therefore, indicate that changes in the plan are desirable. Cost estimates, water supply studies, land classification surveys, and agricultural economic studies have been made on a reconnaissance basis and may also require alterations during future planning work.

This statement is based on the physical plan of development presented in the Bureau of Reclamation reconnaissance report entitled "Gunnison River Project, Colorado," dater February 1951. Results of reconnaissance estimates reflecting October 1954 construction prices are summarized in the attached tabulation.

Summary reconnaissance data, Ohio Creek project, Colorado

Irrigated acreage:	*Acres*
New land	6,200
Supplemental land	10,710
Total	16,910
Principal agricultural production:	
Hay, pasture, and small grains.	
Beef cattle and sheep.	
Irrigation water supply:	*Acre-feet*
Increase in annual irrigation supply	36,700
Increase in annual stream depletion	9,300
Project works:	
Construction features would consist of a storage reservoir, irrigation service canal, and a lateral system. The potential Castleton Reservoir would be constructed to a capacity of 10,000 acre-feet to provide regulatory storage for the project. The Castleton site is located on Castle Creek, a tributary of Ohio Creek. The Ohio Creek Canal, 18 miles in length, would deliver the irrigation water to lands of the project.	
Construction cost and repayment:	
Estimated construction cost	$3,402,000
Reimbursable allocation to irrigation	3,402,000
Nonreimbursable allocation	None
Repayment by:	
Irrigation water users	35,000
Power revenues of Colorado River storage project	3,367,000
Total	3,402,000
Annual operation, maintenance, and replacement costs	19,500
Benefit-cost ratio	1.5 to 1


WYOMING
NEB
UTAH
COLORADO
KANSAS
NEW MEXICO
OKLA
DENVER
OHIO CREEK PROJECT
LOCATION MAP
Pass Cr.
Castle Cr.
Baldwin
CASTLETON RESERVOIR
Mill Cr.
OHIO CREEK CANAL
N
EXPLANATION
Potential Project Features
Presently irrigated lands to receive project water
New lands to receive project water
Canal
Reservoir
Gunnison River
Gunnison
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
REGION 4
OHIO CREEK PROJECT
COLORADO
SCALE OF MILES
JANUARY 1955
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828-400-1

Senator ANDERSON. This is like others where you have not had much opportunity to finish your work on them.

Mr. LARSON. All information on the 20 projects is reconnaissance except for the Fruitgrowers Dam extension and Savery-Pot Hook projects.

Senator ANDERSON. These could be pushed along fairly rapidly once you got underway. It is the type of project where the agricultural economy is pretty well established and you do not have to make studies of it.

Mr. LARSON. We still have to make detailed studies.

Senator ANDERSON. Thank you. The next one, please.

Mr. LARSON. The Parshall project in Colorado consists of 24,410 acres of new land, 3,100 acres of supplemental lands, or a total of 27,510 acres.

Senator ANDERSON. On this one I see there is a very substantial payment by the irrigation water users. Is this located in a little better region for this type of development?

Mr. LARSON. The total estimated construction cost is $11,881,900, and the repayment is $1,420,000. The rest would have to come from the revenues of the Colorado River storage project.

Senator ANDERSON. I was figuring this is about $50 an acre where you had one of a dollar an acre payment by the landowner. The dollar payment looked kind of low to me. You have $120 an acre against a good deal of my farm.

Mr. LARSON. The operation and maintenance cost of the works have quite a lot to do as to what is left of the irrigator's net income for construction costs.

Senator ANDERSON. That is an important factor we have to bear in mind when we come to consider the project. That would help justify the rather low charge if the operation and maintenance charges are high.

The statement on the Parshall project may be inserted in the record at this point.

(The statement referred to follows:)

STATEMENT ON THE PARSHALL PROJECT, COLORADO

(Reconnaissance data)

The potential Parshall project would provide for the full irrigation of 24,410 acres of new land and would supply supplemental water to 3,100 acres of partially irrigated land along Williams River, Little Muddy Creek, and the lower east side of the Blue River Valley in the vicinity of the communities of Parshall and Kremmling, Grand and Summit Counties in north central Colorado. The project would also aid in fishery and wildlife conservation.

The basic type of agriculture in the area, which is the ranging and feeding of livestock, would remain virtually unchanged with project development because of climatic limitations on crop diversification and the availability of extensive areas of summer range in the adjacent mountains. Some of the project lands, however, are devoted to cash crops such as small grain and truck. With project development, hay and grain would continue to be the principal crops grown. These would generally be utilized locally for winter feed for livestock.

Principal construction features of the project would include the Ute Park Dam and Reservoir of 43,000-acre-foot total capacity on Williams River; the Skylark Canal, approximately 45 miles in length, extending westward from the reservoir outlet to lands along the west side of the Williams River Valley and the east side of the lower Blue River Valley; the Sylvan Canal extending eastward about 17 miles from the reservoir outlet along the east side of the Williams River Valley into the valley of the Little Muddy Creek; and enlargement and

extension of the existing Big Lake ditch which serves lands on the west side of the Williams River. About 3 years would be required for construction of the project features.

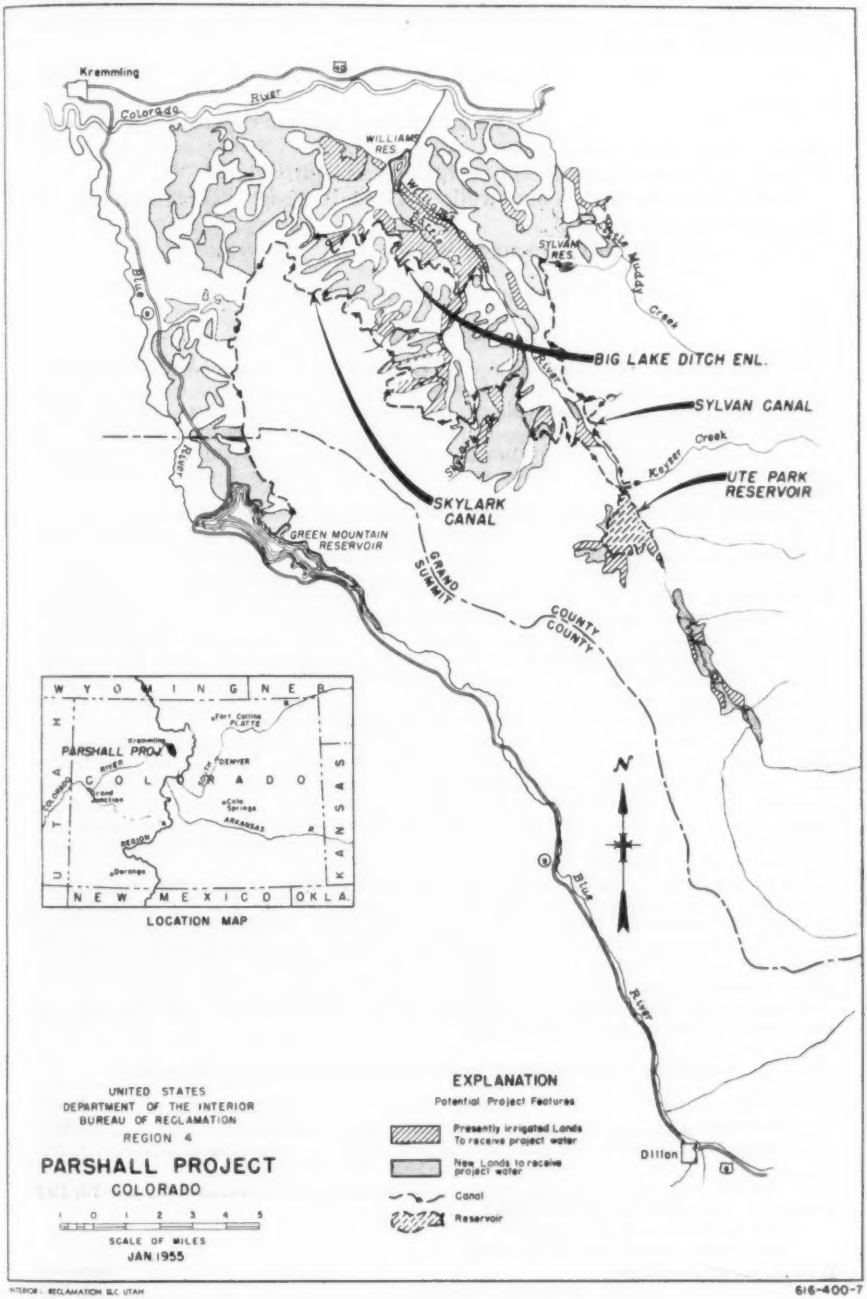
Reconnaissance land classification surveys indicate that the lands are suitable for sustained crop production under irrigation farming, but confirmation can be made only by detailed classification. Water supply studies, based on records of streamflows as they have occurred in the past, indicate that an adequate irrigation supply would be available for the project with permissible shortages in occasional drought years. Water rights for the project could probably be obtained under provisions of Colorado State law.

This statement is based on the physical plan of development for the Parshall unit of the Cliffs-Divide project as presented in the Bureau of Reclamation status report on that project, dated February 1954. The Cliffs-Divide status report is of reconnaissance scope and detailed investigation of the various units presented therein may show the need for modification of development plans in order to provide the greatest degree of economic justification.

Results of reconnaissance estimates reflecting October 1954 construction prices are shown in the attached tabulation.

Summary reconnaissance data, Parshall project, Colorado

Irrigated acreage:		*Acres*
New lands		24,410
Supplemental lands		3,100
Total		27,510
Principal agricultural production:		
Hay, pasture, and small grains.		
Beef cattle, sheep, and dairy cows.		
Irrigation water supply:		*Acre-feet*
Increase in annual irrigation supply		68,700
Increase in annual stream depletion		28,600
Project works:		
Principal construction features of the project would include the Ute Park dam and reservoir of 43,000 acre-foot total capacity on Williams River; the Skylark Canal, approximately 45 miles in length, extending westward from the reservoir outlet to lands along the west side of the Williams River Valley and the east side of the lower Blue River Valley; the Sylvan Canal extending eastward about 17 miles from the reservoir outlet along the east side of the Williams River Valley into the valley of the Little Muddy Creek; and enlargement and extension of the existing Big Lake ditch which serves lands on the west side of the Williams River. About 3 years would be required for construction of the project features.		
Construction cost and repayment:		
Estimated construction cost		$11,881,900
Reimbursable allocation to irrigation		$11,881,900
Nonreimbursable allocation		None
Repayment by:		
Irrigation water users	$1,420,000	
Power revenues of Colorado River storage project	10,461,900	
		$11,881,900
Annual operation, maintenance, and replacement costs		$32,700
Benefit-cost ratio		1-1


Kremmling
Colorado River
WILLIAMS RES.
SYLVAN RES.
Muddy Creek
BIG LAKE DITCH ENL.
SYLVAN CANAL
Creek
Kaiser
UTE PARK RESERVOIR
SKYLARK CANAL
GREEN MOUNTAIN RESERVOIR
GRAND SUMMIT
COUNTY
COUNTY
Blue River
Dillon
N
LOCATION MAP
WYOMING
NEBR.
COLORADO
UTAH
KANSAS
NEW MEXICO
OKLA.
PARSHALL PROJ.
Fort Collins
PLATTE
DENVER
Grand Junction
Colo Springs
ARKANSAS
REGION 4
Durango
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
REGION 4
PARSHALL PROJECT
COLORADO
1 0 1 2 3 4 5
SCALE OF MILES
JAN. 1955
EXPLANATION
Potential Project Features
Presently Irrigated Lands To receive project water
New Lands to receive project water
Canal
Reservoir
INTERIOR - RECLAMATION SLC UTAH
616-400-7

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Senator ANDERSON. Let us go to the next one.

Mr. LARSON. The Rabbit Ear project consists of 13,955 acres of new land and 5,235 acres of supplemental land, or a total of 19,190 acres. The benefit-cost ratio is 1.3 to 1.

Senator ANDERSON. This might be used for something besides hay and pasture?

Mr. LARSON. No, this is hay and pasture and small grains, with beef cattle, sheep, and dairy cows.

The repayment there by the water users is quite small.

Senator ANDERSON. Very well. We will insert the statement in the record at this point.

(The statement referred to follows:)

STATEMENT ON THE RABBIT EAR PROJECT, COLORADO

(Reconnaissance data)

The potential Rabbit Ear project in Grand County, north-central Colorado, would regulate surplus runoff of Muddy Creek, tributary to the Colorado River near Kremmling, Colo., to provide for the irrigation of 13,955 acres of new service land and 5,235 acres of supplemental service land. The project lands are located in the Muddy Creek drainage, south and west of Kremmling. The project would also provide some flood-control benefits and also increase fishery and wildlife values.

Ranging and feeding livestock is the predominant type of agriculture followed in the project area. A short growing season, resulting from the high elevation of the project lands, limits crops to hay, small grains, and pasture. It is anticipated that production of these crops would continue to predominate with project development. Most of the crops produced would be locally fed to livestock.

Principal construction features of the project would include the DeBerard Dam and Reservoir with a total capacity of 22,500 acre-feet, the DeBerard Canal extending from the reservoir outlet 28 miles along the west side of the Muddy Creek Valley, and the Gunsight Canal extending from the reservoir outlet about 38 miles along the east side of the Muddy Creek Valley. About 3 years would be required for construction of the project features.

Reconnaissance land classification surveys indicate that the project lands are suitable for sustained crop production under irrigation farming but confirmation would require detailed classification. Water supply studies, based on streamflows as they occurred in the past, indicate that an adequate irrigation supply would be available for the project with permissible shortages in occasional drought years. Water rights for the project could probably be obtained under provisions of Colorado State law.

This statement is based on the physical plan of development for the Rabbit Ear unit of the Cliffs-Divide project as presented in the Bureau of Reclamation status report on that project, dated February 1954. The investigations leading to that report were of reconnaissance scope and detailed investigations of Rabbit Ear project may show the need for modification of the development plans in order to provide the greatest degree of economic justification.

Results of reconnaissance estimates reflecting October 1954 construction prices are shown in the attached tabulation.

Summary reconnaissance data, Rabbit Ear project, Colorado

Irrigated acreage:	*Acres*
New land	13,955
Supplemental land	5,235
Total	19,190
Principal agricultural production:	
Hay, pasture, and small grains.	
Beef cattle, sheep, and dairy cows.	
Irrigation water supply:	*Acre-feet*
Increase in annual irrigation supply	38,000
Increase in annual stream depletion	16,400

Project works:

Principal construction features of the project would include the DeBerard Dam and Reservoir with a total capacity of 22,500 acre-feet, the DeBerard Canal extending from the reservoir outlet 28 miles along the west side of the Muddy Creek Valley, and the Gunsight Canal extending from the reservoir outlet about 38 miles along the east side of the Muddy Creek Valley. About 3 years would be required for construction of the project features.

Construction cost and repayment:		
Estimated construction cost		$4,733,500
Reimbursable allocation to irrigation		4,733,500
Nonreimbursable allocation		None
Repayment by:		
Irrigation water users	$760,000	
Power revenues of Colorado River Storage project	3,973,500	
Total		4,733,500
Annual operation, maintenance, and replacement costs		19,000
Benefit-cost ratio		1.3 to 1

Mr. LARSON. The Tomichi Creek project consists of 12,180 acres of new land, 15,400 acres of supplemental land, or a total of 27,580 acres. It is similar to the rest with reference to the principal crops and beef cattle, sheep, and dairy cows.

Senator ANDERSON. I noticed you made no provision whatever for repayment by the water users.

Mr. LARSON. On this project the operation and maintenance cost equals or exceeds the repayment ability of the water users, so we show nothing there. This project has a benefit-cost ratio of 0.9 to 1.

Senator ANDERSON. That is one of the ones you might want to take a careful look at before you actually got into construction of it.

Mr. LARSON. Yes.

Senator ANDERSON. We will insert that information in the record.

(The statement referred to follows:)

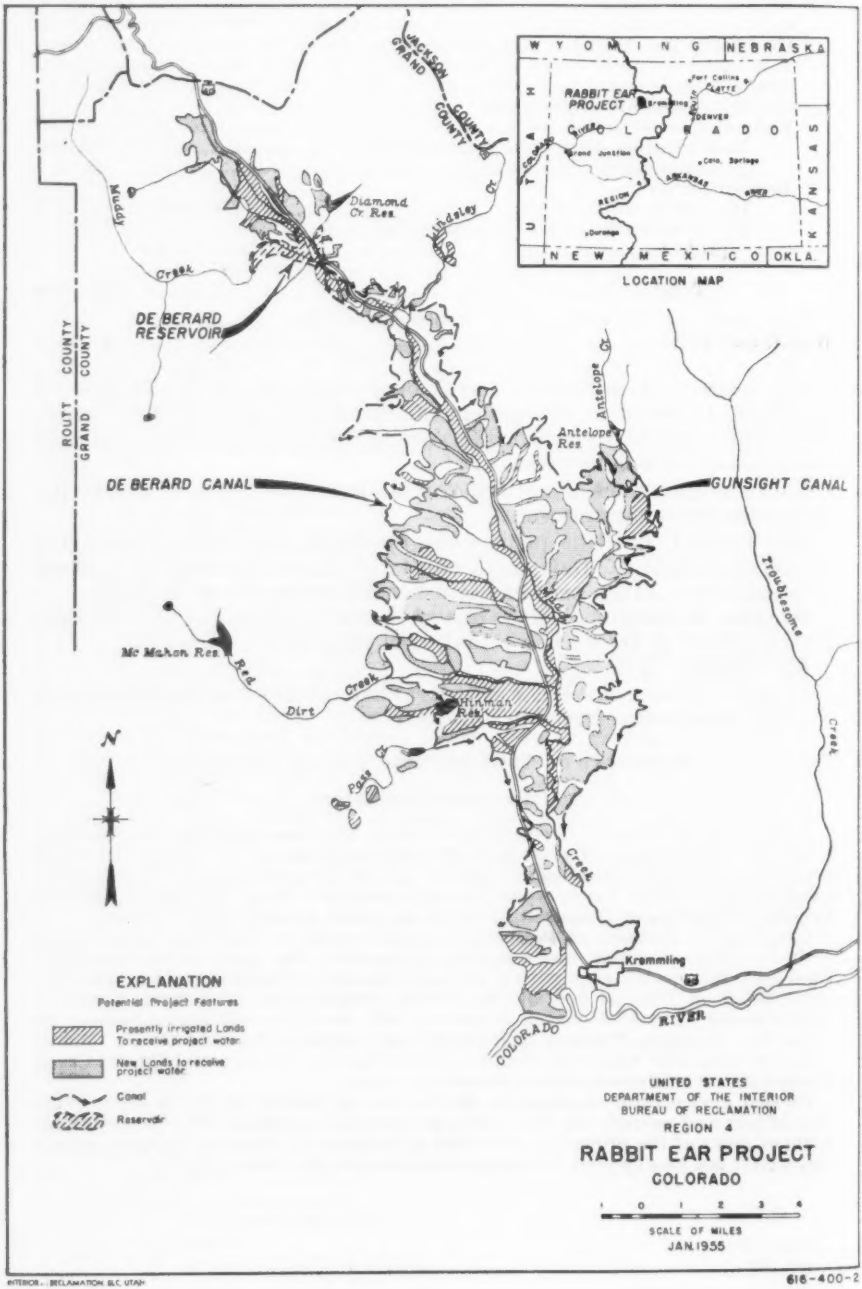
STATEMENT ON TOMICHI CREEK PROJECT, COLORADO

(Reconnaissance data)

The potential Tomichi Creek project would provide supplemental irrigation water for 15,400 acres of presently irrigated land and a new supply for 12,180 acres of arable nonirrigated land located east of the town of Gunnison near the Continental Divide. Water would be made available from Tomichi and Quartz Creeks, tributaries of Gunnison River in the upper Colorado River Basin.

Construction features of the project would consist of 2 storage reservoirs, 2 main distribution canals, and a system of laterals. The potential Monarch and Ohio City Reservoirs, each with a storage capacity of 30,000 acre-feet, would be constructed on Tomichi and Quartz Creeks, respectively. The South Crookton Canal would head at Monarch Reservoir and would extend approximately 28 miles in a westerly direction to irrigate lands south of Tomichi Creek. Water from the Ohio City Reservoir would be distributed by the potential Quartz Creek Canal which would also be about 28 miles in length.

Present agricultural development in the area is limited largely to the production of hay and pasture for the dominant livestock industry. The cropping program of lands of the project is controlled principally by the short growing season and would not be expected to change following project development.


WYOMING NEBRASKA
UTAH COLORADO KANSAS
NEW MEXICO OKLA.
RABBIT EAR PROJECT
Fort Collins
Platte
DENVER
Grand Junction
Colo. Springs
Durango
LOCATION MAP
JACKSON COUNTY
GRAND COUNTY
ROUTT COUNTY
GRAND COUNTY
Muddy Creek
Diamond Cr. Res.
Hiddeley Cr.
DE BERARD RESERVOIR
DE BERARD CANAL
Antelope Cr.
Antelope Res.
GUNSIGHT CANAL
Troublesome Creek
Mc Mahon Res.
Red Dirt Creek
Hitchman Res.
Pass Creek
Kremmling
COLORADO RIVER
N
EXPLANATION
Potential Project Features
Presently irrigated Lands To receive project water
New Lands to receive project water
Canal
Reservoir
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
REGION 4
RABBIT EAR PROJECT
COLORADO
0 1 2 3 4
SCALE OF MILES
JAN. 1955
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616-400-2

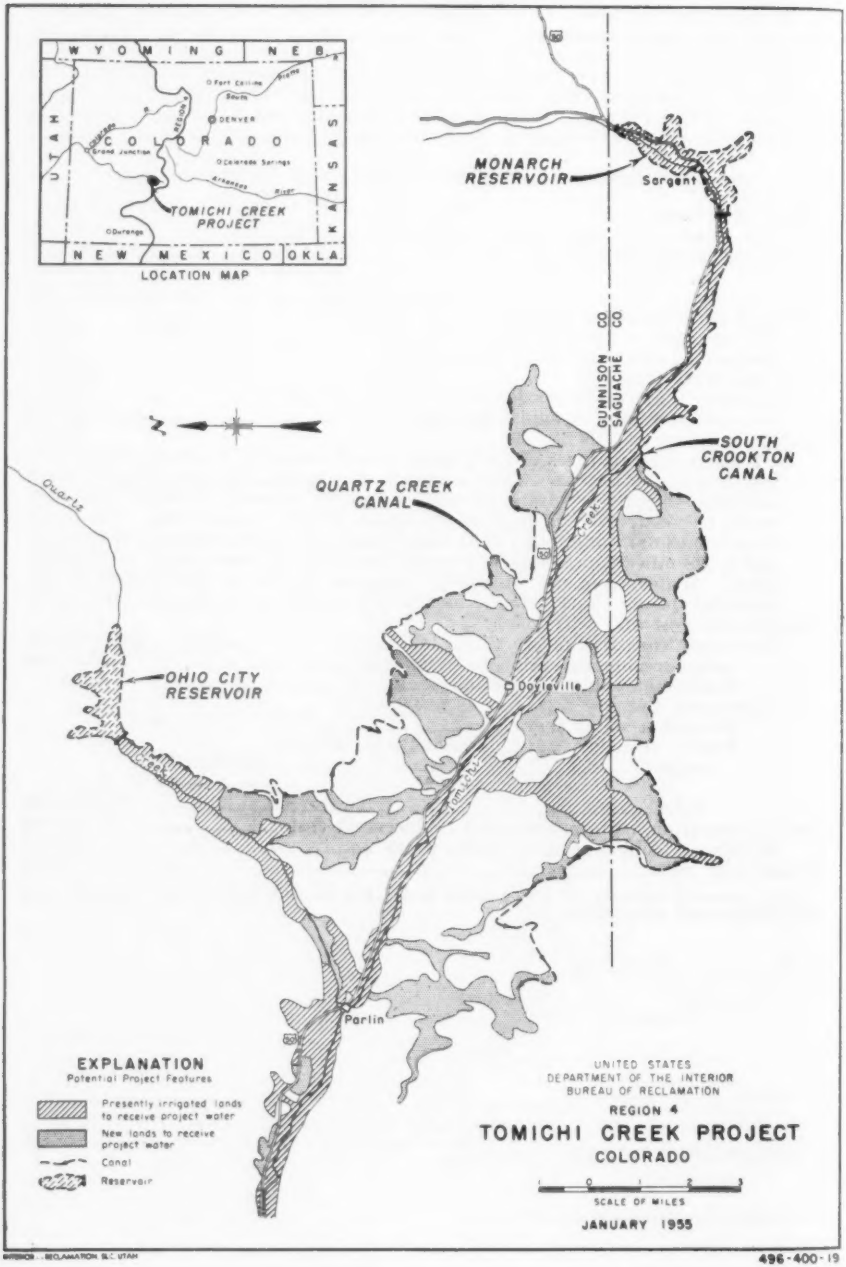
The plan of development has been formulated through consideration of physical limitations and does not necessarily define the economic limitations of the development. A more detailed investigation may, therefore, indicate that changes in the plan are desirable. Cost estimates, water-supply studies, land-classification surveys, and agricultural economic studies have been made on a reconnaissance basis and may also require alterations during future planning work.

This statement is based on the physical plan of development presented in the Bureau of Reclamation reconnaissance report, entitled "Gunnison River Project, Colorado," dated February 1951. Results of reconnaissance estimates reflecting October 1954 construction prices are summarized in the attached tabulation.

Summary reconnaissance data, Tomichi Creek project, Colorado

Irrigated acreage:		*Acres*
New land		12,180
Supplemental land		15,400
Total		27,580
Principal agricultural production:		
Hay, pasture, and small grains.		
Beef cattle, sheep, and dairy cows.		
Irrigation water supply:		*Acre-feet*
Increase in annual irrigation supply		66,600
Increase in annual stream depletion		17,700
Projects works:		
Construction features of the project would consist of 2 storage reservoirs, 2 main distribution canals, and a system of laterals. The potential Monarch and Ohio City Reservoirs, each with a storage capacity of 30,000 acre-feet, would be constructed on Tomichi and Quarz Creeks, respectively. The South Crookton Canal would head at Monarch Reservoir and would extend approximately 28 miles in a westerly direction to irrigate lands south of Tomichi Creek. Water from the Ohio City Reservoir would be distributed by the potential Quartz Creek Canal which would also be about 28 miles in length.		
Construction cost and repayment:		
Estimated construction cost		$11,523,000
Reimbursable allocation to irrigation		11,523,000
Nonreimbursable allocation		None
Repayment by:		
Irrigation water users	0	
Power revenues of Colorado River Storage project	$11,523,000	
Total		11,523,000
Annual operation, maintenance, and replacement costs		47,840
Within payment capacity of water users [1]		36,700
Benefit-cost ratio		0.9 to 1

[1] The payment capacity of water users would not be sufficient to pay operation and maintenance and replacement.


WYOMING
NEBR.
COLORADO
UTAH
KANSAS
NEW MEXICO
OKLA.
DENVER
Fort Collins
Grand Junction
Colorado Springs
Durango
TOMICHI CREEK PROJECT
LOCATION MAP
MONARCH RESERVOIR
Sargent
GUNNISON
SAGUACHE
SOUTH CROOKTON CANAL
QUARTZ CREEK CANAL
Quartz Creek
OHIO CITY RESERVOIR
Gunnison River
Parlin
EXPLANATION
Potential Project Features
Presently irrigated lands to receive project water
New lands to receive project water
Canal
Reservoir
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
REGION 4
TOMICHI CREEK PROJECT
COLORADO
SCALE OF MILES
JANUARY 1955
496-400-19

Senator ANDERSON. Let us go to the next project.

Mr. LARSON. The Troublesome project consists of 8,990 acres of new land, 4,650 acres of supplemental land, or a total of 13,640 acres.

Senator WATKINS. Can you give us any history on that name?

Mr. LARSON. No. We could attach that to a lot of them when we investigate them.

Senator WATKINS. The name does not have any significance?

Mr. LARSON. Maybe Governor Johnson knows the source of that.

Governor JOHNSON. It is a very troublesome stream to the railroad that operates up there.

Mr. LARSON. And it is called Troublesome.

Governor JOHNSON. Yes, because it caused a great deal of trouble.

Mr. LARSON. We called the project the Troublesome.

Governor JOHNSON. It is a creek that is subject to flash floods, and is a very troublesome stream to the railroads.

Senator ANDERSON. We will insert that statement in the record.

(The statement referred to follows:)

STATEMENT ON TROUBLESOME PROJECT, COLORADO

(Reconnaissance data)

The potential Troublesome project in Grand County, north-central Colorado, would regulate surplus runoff in East Troublesome Creek, tributary of the Colorado River, and would divert surplus flows of the Williams River at the existing Williams Reservoir to provide for the irrigation of 8,990 acres of new land and 4,650 acres of supplemental service land. The project lands are located in the Troublesome Creek Valley and on river benches north of the Colorado River between the towns of Parshall and Kremmling, Colo. The project would also increase fishery, wildlife, and recreational values of the area.

Ranging and feeding of livestock is the predominant type of agriculture followed in the project area. The short growing season, resulting from the high elevation of the project lands, limits crops to hay, small grains, and pasture. It is anticipated that production of these crops would continue to predominate with project development. Most of the crops produced would be locally fed to livestock.

Principal construction features of the project would include the Haypark Dam and Reservoir on East Troublesome Creek with a total capacity of 20,100 acre-feet; the Haypark Canal which would convey water released from the reservoir to the west branch of Troublesome Creek above the heading of the existing Kurtz No. 2 ditch; enlargement and extension of the Kurtz No. 2, ditch; and the Kremmling Canal which would extend from an outlet from the Williams Reservoir on Williams River across the Colorado River by siphon and along the benchlands north of the Colorado River from near Parshall westward to Kremmling. About 3 years would be required for construction of the project features.

Reconnaissance land classification surveys indicate that the project lands are suitable for sustained crop production under irrigation farming but confirmation would require detailed classification. Water supply studies, based on records of streamflows as they have occurred in the past, indicate that an adequate irrigation supply would be available for the project, with permissible shortages in occasional drought years under the Kurtz No. 2 ditch and no shortages under the Kremmling Canal. Water rights for the project could probably be obtained under provisions of Colorado State law.

This statement is based on the physical plan of development for the Troublesome unit of the Cliffs-Divide project as presented in the Bureau of Reclamation status report on that project, dated February 1954. The Cliffs-Divide status report is of reconnaissance scope and detailed investigations of the various features presented therein may show the need for modification of the development plans in order to provide the greatest degree of economic justification.

Results of reconnaissance estimates reflecting October 1954 construction prices are shown in the attached tabulation.

Summary reconnaissance data, Troublesome project, Colorado

Irrigated acreage:	*Acres*
New lands	8,990
Supplemental lands	4,650
Total	13,640
Principal agricultural production:	
Hay, pasture, and small grains.	
Beef cattle, sheep, and dairy cows.	
Irrigation water supply:	*Acre-feet*
Increase in annual irrigation supply	29,200
Increase in annual stream depletion	13,000
Project works:	
Principal construction features of the project would include the Haypark Dam and Reservoir on East Troublesome Creek with a total capacity of 20,100 acre-feet; the Haypark Canal which would convey water released from the reservoir to the west branch of Troublesome Creek above the heading of the existing Kurtz No. 2 ditch; enlargement and extension of the Kurtz No. 2 ditch; and the Kremmling Canal which would extend from an outlet from the Williams Reservoir on Williams River across the Colorado River by siphon and along the benchlands north of the Colorado River from near Parshall westward to Kremmling. About 3 years would be required for construction of the project features.	
Construction cost and repayment:	
Estimated construction cost	$5,243,000
Reimbursable allocation to irrigation	5,243,000
Nonreimbursable allocation	None
Repayment by:	
Irrigation water users $725,000	
Power revenues of Colorado River storage project 4,518,000	
Total	5,243,000
Annual operation, maintenance, and replacement costs	14,700
Benefit-cost ratio	1.2 to 1

Senator ANDERSON. We now go to the West Divide.

Mr. LARSON. The West Divide project consists of 40,500 acres of new land and 25,110 acres of supplemental land, or a total of 65,610 acres.

Senator ANDERSON. On this one I notice that the irrigation water users will make a very substantial repayment running $90 or so an acre. This must be very good land.

Mr. LARSON. It is a fairly good area. The irrigators there can pay $5,960,000 out of a total cost of $79 million, and so forth.

Senator ANDERSON. Is that because of the use of the water in the surrounding towns?

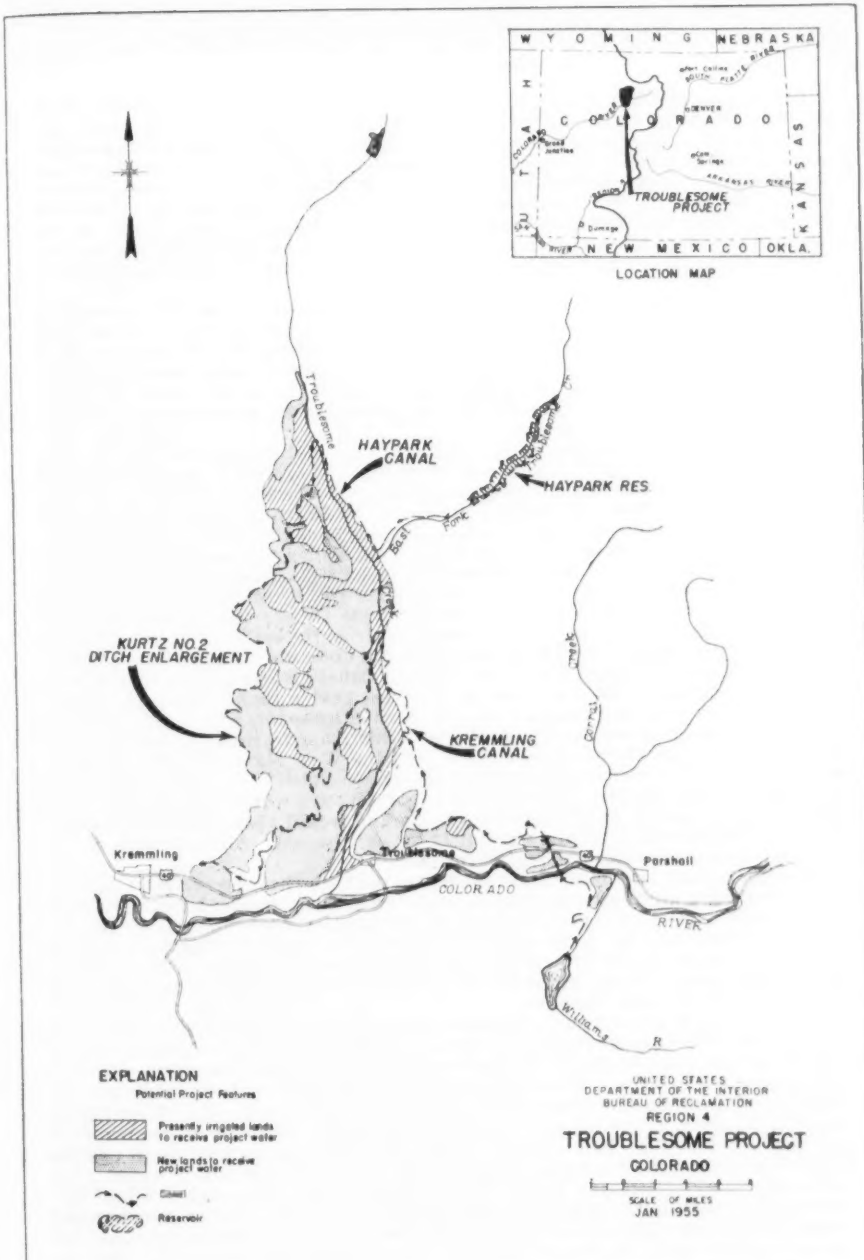
Mr. LARSON. I do not believe that they have any allocation of municipal water segregated out on this project.

Governor JOHNSON. Is it in a fruitgrowing area?

Mr. LARSON. No.

Senator ANDERSON. I notice it mentions here something about the towns. So the West Divide project offers an opportunity to better the municipal water supplies of the towns of Silt, Rifle, Grand Valley, and DeBeque as well as to provide water for potential new municipal and industrial demands which would arise with oil shale development in the Rifle-DeBeque area. So this provides many things in addition.

Mr. LARSON. Yes, that will have to be studied in the detailed investigation.



INTERIOR - RECLAMATION SLC UTAH

616-400-5

(The statement referred to follows:)

STATEMENT ON THE WEST DIVIDE PROJECT, COLORADO

(Reconnaissance data)

The potential West Divide project would regulate and divert surplus runoff of Crystal River, Thompson Creek, West Divide Creek, and Mamm Creek and would divert surplus runoff of several tributaries of the Roaring Fork and Colorado Rivers in order to provide for the irrigation of 40,500 acres of new land and 25,110 acres of supplemental service land. The lands are located along the west side of the Roaring Fork drainage in the vicinity of Carbondale and Glenwood Springs, Colo., and along the south side of the Colorado River Valley in the vicinity of the towns of New Castle, Silt, Rifle, Grand Valley, and DeBeque, Colo. The project area is contained in Pitkin, Garfield, and Mesa counties, west-central Colorado.

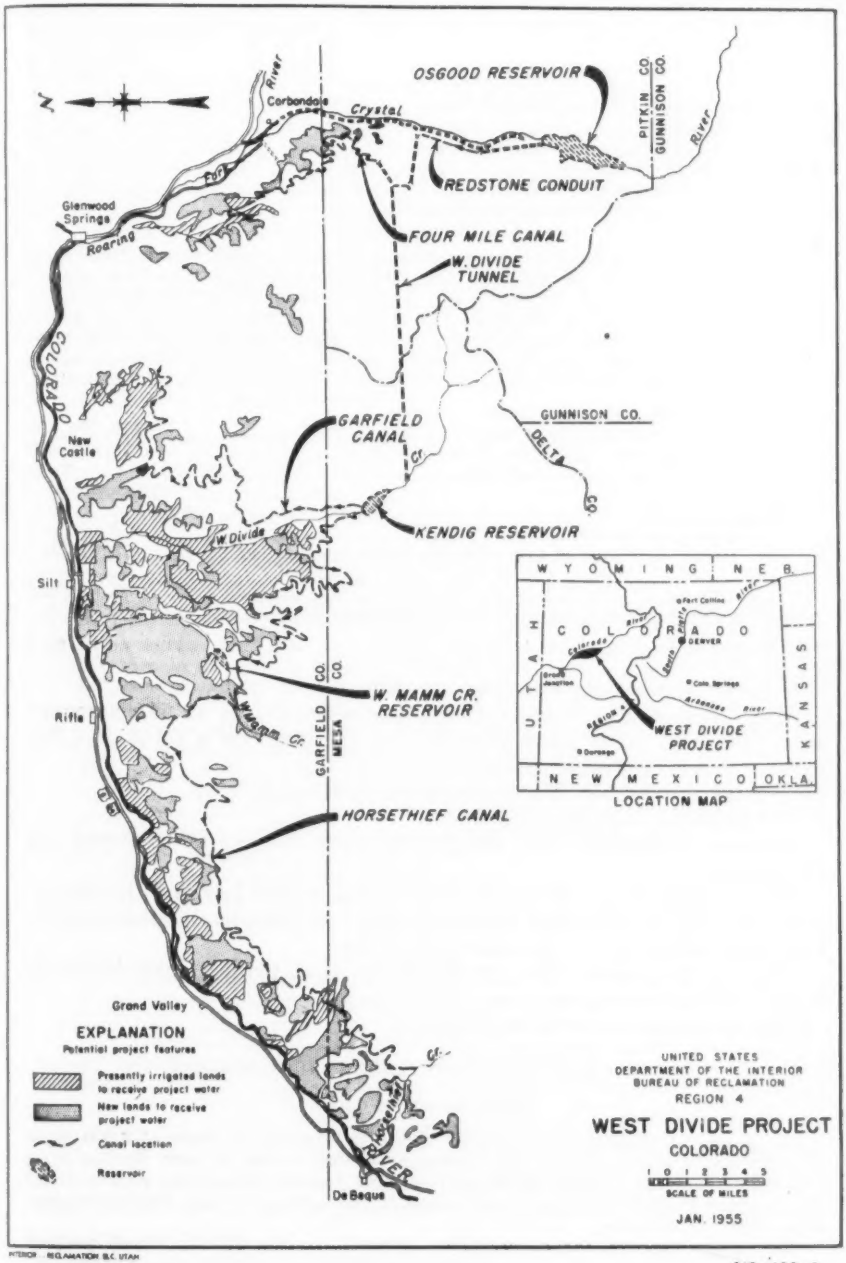
Ranging and feeding livestock is the principal type of agriculture followed in the project area along the Roaring Fork and in the higher elevations of the West Divide Creek drainages. It is anticipated that after project development these areas would continue to be used principally for livestock feeds, such as alfalfa, small grains, and pasture. More than 50 percent of the project lands, however, are suitable for general diversified farming including the production of potatoes, sugar beets, truck crops, and fruit.

Principal construction features of the project would include the Osgood Dam and Reservoir on Crystal River near Redstone, Colo., with a total capacity of 99,500 acre-feet; the Redstone conduit consisting of a series of tunnels and bench flumes extending from the Osgood Reservoir to North Thompson Creek near Carbondale, Colo.; the Four Mile Canal extending from the outlet of the Redstone conduit along the west side of the Roaring Fork Valley to Four Mile Creek near Glenwood Springs, Colo.; the West Divide tunnel, 15.7 miles in length, extending through a mountain range from the terminus of the Redstone conduit on North Thompson Creek to the channel of West Divide Creek; the Horsethief Canal diverting from West Divide Creek downstream from the outlet of the West Divide tunnel and extending along the south side of the Colorado River Valley to Horsethief Creek near DeBeque, Colo.; the Garfield Canal diverting from West Divide Creek downstream from the outlet of the West Divide tunnel and extending to Garfield Creek near New Castle, Colo.; the Kendig Reservoir with a total capacity of 12,000 acre-feet on West Divide Creek downstream from the diversion works for the Horsethief and Garfield Canals; and the West Mamm Reservoir with a total capacity of 7,400 acre-feet on West Mamm Creek below the Horsethief Canal crossing on that stream. These latter two reservoirs would regulate the flows West Divide, Mamm, and Thompson Creeks and would also reregulate releases from the Osgood Reservoir on Crystal River as required. About 6 years would be required for the construction of the project.

Reconnaissance land classification surveys indicate that the project lands are suitable for sustained crop production under irrigation farming but confirmation would require detailed classification. Water supply studies, based on records of streamflows as they have occurred in the past, indicate that an adequate irrigation supply would be available for the project with permissible shortages in drought years. Water rights for the project could probably be obtained under provisions of Colorado State law.

This statement is based on the physical plan of development for the West Divide unit of the Cliffs Divide project as presented in the Bureau of Reclamation status report on that project, dated February 1954. The Cliffs-Divide status report is reconnaissance in scope. Development plans in the investigations leading to the report were formulated for maximum irrigation development. The West Divide project, however, offers an opportunity to better the municipal water supplies for the towns of Silt, Rifle, Grand Valley, and DeBeque as well as to provide water for potential new municipal and industrial demands which would arise with oil shale development in the Rifle-DeBeque area. The project would also afford the opportunity to develop hydroelectric energy in relation to municipal water supply and other potentialities of the development. Detailed studies of the project would point out these potential developments and show any need for modificaion of the reconnaissance irrigation development plan in order to provide the greatest degree of economic justification.

Results of reconnaissance estimates for the irrigation plan reflecting October 1954 construction prices are shown in the attached project summary.



INTERIOR RECLAMATION SLC UTAH

616-400-8

Summary reconnaissance data, West Divide project, Colorado

Irrigated acreage:	*Acres*
New land	40,500
Supplemental land	25,110
Total	65,610
Principal agricultural production:	
Alfalfa, small grains, and pasture.	
Beef cattle, sheep, and dairy cows.	
Irrigation water supply:	*Acre-feet*
Increase in annual irrigation supply	180,000
Increase in annual stream depletion	88,100
Project works:	
Principal works would include Osgood Reservoir on Crystal River with total capacity of 99,500 acre-feet, Redstone conduit, Four-Mile Canal, West Divide tunnel 15.7 miles long, Horsethief Canal, Garfield Canal, Kendig Reservoir on West Divide Creek with total capacity of 12,000 acre-feet, and West Mamm Reservoir on West Mamm Creek with total capacity of 7,400 acre-feet. Laterals and drains would be included as necessary. About 6 years would be required for constructing the project.	
Construction cost and repayment:	
Estimated construction cost	$79,675,600
Reimbursable allocation to irrigation	79,675,600
Nonreimbursable allocation	None
Repayment by:	
Irrigation water users	5,960,000
Power revenues of Colorado River storage project	73,715,600
Total	79,675,600
Annual operation, maintenance, and replacement costs	96,700
Benefit-cost ratio	1 to 1

Senator ANDERSON. The next one, then.

Mr. LARSON. The Woody Creek project consists of 645 acres of new land and 2,320 acres of supplemental land, or a total of 2,965 acres. It is a very small project.

Senator ANDERSON. Mostly supplemental land.

Mr. LARSON. Yes; that is correct.

Senator ANDERSON. The irrigation users are going to repay all the money.

Mr. LARSON. Yes. This is one where the cost is low and the repayment ability is such that they can pay out completely, the benefit-cost ratio being 3 to 1. It is the highest one.

Senator ANDERSON. The statement on that project may be made a part of the record.

(The statement referred to follows:)

STATEMENT ON THE WOODY CREEK PROJECT, COLORADO

(Reconnaissance data)

The potential Woody Creek project would provide an average of 3,900 acre-feet of water annually for the irrigation of 645 acres of new service land and 2,320 acres of supplemental service land located along the east side of the Roaring Fork River Valley and north of the town of Aspen, Pitkin County, west central Colorado.

The major type of farm enterprise followed in the Woody Creek project area is general livestock. It is anticipated that the present crop production, consisting principally of hay, small grains, and pasture, would remain virtually unchanged with project development. Most of the crops produced would be locally fed to livestock.

Principal construction work would include the enlargement, extension, and rehabilitation of the existing Salvation ditch which diverts from the Roaring Fork River about 1 mile upstream from Aspen and the replacement of an inadequate diversion dam on Woody Creek, tributary to the Roaring Fork, about 12 miles downstream from Aspen. Construction of the Woody Creek project could readily be accomplished in 1 year.

Reconnaissance land classification surveys indicate that the project lands are suitable for sustained crop production under irrigation farming but confirmation would require detailed classification. Water supply studies, based on streamflows as they have occurred in the past, indicate that an adequate irrigation supply would be available at all times for the project by virtue of absolute decrees to the existing canal systems under the project. Operation of the project as planned, however, would depend on certain exchanges in place of use of these decreed waters. It may therefore be necessary to make additional water filings to secure a full project water supply.

This statement is based on the physical plan of development for the Woody Creek unit of the Cliffs-Divide project as presented in the Bureau of Reclamation status report on that project, dated February 1954. The Cliffs-Divide status report is of reconnaissance scope and detailed investigations of the various feaures presented herein may show the need for modification of the development plans in order to provide the greatest degree of economic justification.

Results of reconnaissance estimates reflecting October 1954 construction prices are shown in the attached tabulation.

Summary reconnaissance data, Woody Creek project, Colorado

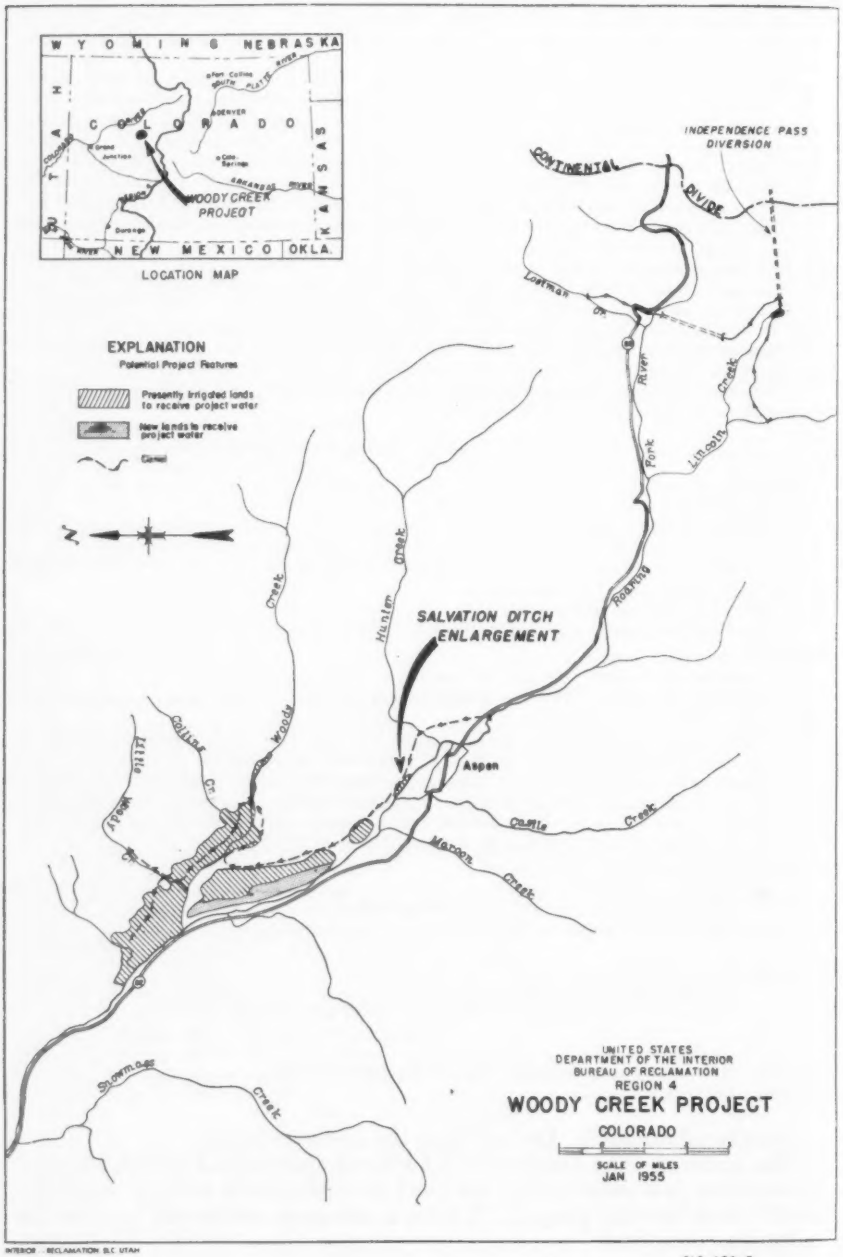
Irrigated acreage:	*Acres*
New land	645
Supplemental land	2,320
Total	2,965
Principal agricultural production:	
Hay, pasture, small grains.	
Beef cattle, sheep, and dairy cows.	
Irrigation water supply:	*Acre-feet*
Increase in annual irrigation supply	3,900
Increase in annual stream depletion	1,400
Project works:	
Principal construction work would include the enlargement, extension, and rehabilitation of the existing Salvation ditch which diverts from the Roaring Fork River about 1 mile upstream from Aspen and the replacement of an inadequate diversion dam on Woody Creek, tributary to the Roaring Fork, about 12 miles downstream from Aspen. Construction of the Woody Creek project could readily be accomplished in 1 year.	
Construction cost and repayment:	
Estimated construction cost	$177,700
Reimbursable allocation to irrigation	177,700
Nonreimbursable allocation	None
Repayment by:	
Irrigation water users	177,700
Power revenues of Colorado River storage project	0
Total	177,700
Annual operation, maintenance, and replacement costs	3,100
Benefit-cost ratio	3 to 1

Senator ANDERSON. Do you have the Juniper unit?

Mr. LARSON. The Juniper unit I believe Governor Johnson has recommended as a substitution for the Cross Mountain unit of the Colorado River storage project. I have a one-page statement here to file with the committee.

Senator ANDERSON. Was not the Cross Mountain project in the bill?

Mr. LARSON. Yes.


WYOMING NEBRASKA
COLORADO
UTAH
KANSAS
NEW MEXICO OKLA.
WOODY CREEK PROJECT
LOCATION MAP
EXPLANATION
Potential Project Features
Presently irrigated lands to receive project water
New lands to receive project water
Canal
INDEPENDENCE PASS DIVERSION
CONTINENTAL DIVIDE
Lostman Gr.
Lincoln Creek
Roaring Fork
Hunter Creek
SALVATION DITCH ENLARGEMENT
Collins Gr.
Woody Creek
Little Woody Creek
Aspen
Castle Creek
Maroon Creek
Snowmass Creek
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
REGION 4
WOODY CREEK PROJECT
COLORADO
SCALE OF MILES
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Senator ANDERSON. Was it not put in the bill in the House last year?

Governor JOHNSON. It was in Senate bill 1555. However, Cross Mountain floods the Maybell Valley, which is the largest irrigated area in Moffett County. There is local objection to building Cross Mountain. Cross Mountain is a very fine reservoir.

Senator ANDERSON. It is right up in your home community, is it not, Governor?

Governor JOHNSON. Yes, sir. It has a capacity of over 5 million acre-feet, and a good power project and all. It is to be hoped that the Reclamation Bureau will be able to build a smaller dam in Cross Mountain in connection with the Juniper project to provide power and water for areas in Colorado, both in Moffett County and Rio Blanca County, and in Utah. Utah gets 500,000 acre-feet at the Yampa River at the Maybell measuring station each year, and it is to be hoped that we can send some of that water down to them from Cross Mountain down to the area in Utah, which is very familiar to Senator Watkins.

Senator WATKINS. Just a moment, Governor. I am at a loss to know just where Utah uses any of that water.

Governor JOHNSON. Utah has some barren lands or unirrigated lands near Blue Mountain, as the Senator knows.

Senator WATKINS. There is plenty of unirrigated land there.

Governor JOHNSON. Also, Moffett County, Rio Blanca County, and Utah. Under the upper basic compact Utah gets 500,000 acre-feet of water per year out of the Yampa River at Maybell, and it is to be hoped that some of that water can be used down there on those barren lands that we speak of in Utah.

Senator WATKINS. May I ask, Mr. Larson, do you have this proposed development?

Mr. LARSON. Yes, sir. I have a half-page statement here that covers the Juniper, if you care to have it read, or I can file it.

Senator WATKINS. I mean the Utah development. I did not know of any study having been made there. I am glad to know of it, Governor, and I thank you very much for the information.

Governor JOHNSON. I hope the Reclamation Bureau can find a way of taking water from Cross Mountain without building a dam that is going to inundate the whole Maybell Valley, and take water that will irrigate Lily Park and a very large area below Blue Mountain in Colorado and in Utah.

Senator WATKINS. I am not opposing your recommendation. I want that understood. I am merely asking for information.

Governor JOHNSON. It needs to be studied by the Reclamation Bureau. But I hope they do study it in connection with the proposal to substitute Juniper for Cross Mountain.

Mr. LARSON. Do you wish me to file for your record a short statement on Juniper?

Senator ANDERSON. Yes, if you will.

(The statement referred to follows:)

JUNIPER UNIT

(Analysis based on reconnaissance data)

The Juniper Dam site is on the Yampa River about 10 miles upstream from the town of Maybell and about 24 miles downstream from the town of Craig. A reservoir to impound 1,500,000 acre-feet would back water to within 3 miles of Craig. The dam site is located within the potential Cross Mountain Reser-

voir and if constructed would limit the height of the Cross Mountain Dam to 145 feet with a reservoir of about 600,000 acre-feet. As a result the construction of Juniper would reduce the amount of storage now contemplated on the Yampa River by about 2.5 million acre-feet. The combined Juniper and small Cross Mountain developments would be less attractive for power production than the large single Cross Mountain unit. Also, their combined capacities, being only slightly greater than the average annual flow of the Yampa River, would contribute little to the regulation at Lee Ferry.

The Juniper Dam could be utilized as a diversion and storage dam to serve lands in the Deadman Bench project southwest of the dam site. An irrigation canal would divert from the dam at elevation 6,100. The canal would run generally southwest to irrigate approximately 29,000 acres of new land in Colorado and 61,000 acres of new land in Utah between the Yampa and White Rivers.

A reservoir of 1,500,000 acre-feet would permit the generation of about 125 million kilowatt-hours of energy annually with existing streamflows The relatively uniform power releases from the powerplant could probably then be utilized for energy generation at two or three potential power drops downstream above the Echo Park Reservoir.

Power from the Juniper Dam would be marketed through the Colorado River Storage project system.

Reconnaissance data on the Juniper unit are listed below. (Costs are based on October 1954 price levels.)

Cost of dam, access road and construction camp		$10,514,000
Cost of powerplant		4,584,000
Cost of transmission system		1,250,000
Total		16,348,000
Annual operation and maintenance and replacement cost		155,200
Installed capacity of powerplant	kilowatts	25,000
Maximum power head	feet	205
Type of dam		(1)
Initial firm annual energy output	kilowatt-hours	125,000,000
Estimated future annual water use upstream	acre-feet	124,000
Estimated annual diversion to Deadman Bench	do	270,000
Reservoir capacity	do	1,500,000
Maximum water surface area	acres	20,000
Average annual evaporation (1931–47)	acre-feet	38,000

[1] Earth fill.

Senator ANDERSON. Are there questions with reference to these?

Governor JOHNSON. I want to thank Mr. Larson for his testimony.

Senator KUCHEL. When would the Department in your judgment have its final report available, Mr. Larson?

Mr. LARSON. On these 20 projects?

Senator KUCHEL. Yes, sir.

Mr. LARSON. At our present rate of expenditures in region 4 in all the States that we cover, I would say that it would be 3 or 4 years, or maybe longer, to cover all the projects that we are requested to cover in detail.

Governor JOHNSON. It is my understanding that all of the participating projects in the bill must be reviewed, studied, reauthorized by the Congress before construction can start on any of them.

Senator KUCHEL. Is that correct, Governor?

Senator ANDERSON. No; it is not correct.

Governor JOHNSON. Of the participating projects.

Senator ANDERSON. Yes. Not all of them have to come back. I do not believe they even do under the Rogers bill. A great many have to be approved by the Secretary of the Interior again. Some have to come back to Congress for approval.

Senator MILLIKIN. What is the line of distinction?

Senator ANDERSON. When they come back for congressional approval—may I read the language? This is from the Rogers bill, page 3, line 13:

Provided, That (a) construction of a participating project set forth in this clause (2) shall not be undertaken until the Secretary has reexamined the economic justification of such project and, accompanied by appropriate documentation in the form of a supplemental report, has certified to the Congress, through the President, that, in his judgment, the benefits of such project will exceed its costs, and that the financial reimbursability requirements set forth in section 4 of this Act can be met. The Secretary's supplemental report for each such project shall include, among other things, (i) a reappraisal of the prospective direct agricultural benefits of the project made by the Secretary after consultation with the Secretary of Agriculture; (ii) a reevaluation of the nondirect benefits of the project; and (iii) allocations of the total cost of construction of each patricipating project or separable features thereof, excluding any expenditures authorized by section 7 of this Act, to power, irrigation, municipal water supply, flood control or navigation, or any other purpose authorized under reclamation law.

Senator KUCHEL. So that to that extent each of these bills in itself would be a completely effective authorization for the projects which it would include, is that not right?

Senator ANDERSON. As participating projects with the exception of the new Mexico projects where a separate provision is set up in order that we may meet our obligation to the State of Texas and so forth.

Senator KUCHEL. Yes, sir.

Senator ANDERSON. As a matter of fact, most of the projects that Governor Johnson has mentioned this morning are the types of projects that under the small water bill, Senate 405, could now be authorized in the individual States by the State engineer. We set a $5-million limitation on that bill. It is not yet law, I grant you, but it was favorably considered by the Senate last year. There is a $5-million limit on that.

In that bill the State authorities could pass on a great many projects which are listed here, because they are relatively small projects.

Governor JOHNSON. We have plenty of other projects, Senator.

Senator ANDERSON. Eight out of your 18 projects would be under the $5-million limit, and the original proposal was a $10-million limit, and that would get a good many more of them. So at least 12 would be under the limit as originally proposed. I am only saying that, while I recognize Mr. Larson will have some work and it will take him in the normal course of events, 3, 4, or 5 years, these are not types of projects over which Congress would ordinarily spend much time in final examination, once there had been certification by the Secretary that the benefits exceed cost.

Governor JOHNSON. May I say, Senator, that originally I had 43 participating projects and the various groups that I appeared before trimmed them down until I came up with only 18. So Colorado does have a great many participating projects that are not listed here that might be built under the plan which you suggest.

Senator ANDERSON. And action by this committee or the Congress would not foreclose a subsequent presentation of those projects nor approval of them for inclusion in the power revenues from the dams.

Senator WATKINS. I had a few question to ask of Governor Johnson.

Senator, these projects that Mr. Larson just named and detailed to some extent, and has placed in the record supporting data, does your

amendment propose to put them in the first group of participating projects?

Governor JOHNSON. If you look in section 1 of the Rogers bill you will find where they were put in. They were put in alphabetical order. On page 3 of the Rogers bill, they read as follows:

After the colon on line 5 of the Rogers bill:

Central Utah (initial phase); Cliff-Divide (consisting of eight project units), Dolores, Emery County, Elkhorn, Florida, Gooseberry, Gunnison River (consisting of eight project units), Hammond, Kendall, LaBarge, Lyman, Paonia—

and so on.

On line 12 you will see where Savery-Pot Hook was inserted. I notice that these projects were listed in the original bill alphabetically, so these additional projects were inserted in that list alphabetically in the places where they belong.

Senator ANDERSON. I have not heard anything on the Gooseberry project, have I, this morning?

Mr. LARSON. That was included in my statement yesterday because it is in S. 500. That is true also of Curecanti.

Senator ANDERSON. Are there additional questions?

Senator KUCHEL. Mr. Chairman, I would like to ask the Governor a few questions. I have no questions for Mr. Larson.

Senator ANDERSON. I wonder if we could start this afternoon. Could you be back at 2 o'clock?

Governor JOHNSON. I am available at any time for any questions.

Senator ANDERSON. We will take a recess until 2 o'clock.

(Thereupon at 12:30 p. m., a recess was taken until 2 p. m., the same day.)

AFTERNOON SESSION

The subcommittee reconvened at 2 p. m., upon the expiration of the recess.

Senator ANDERSON. Let us be in order.

STATEMENT OF HON. EDWIN C. JOHNSON—Resumed

Senator ANDERSON. When we adjourned this morning the junior Senator from California, Mr. Kuchel, had some questions he desired to ask of Governor Johnson.

We will proceed now with those questions.

Senator KUCHEL. Governor Johnson, first of all, if I understand the participating projects which you, representing the State of Colorado, urged this morning be adopted as a part of S. 500, they would constitute projects under which the waters would be used for the beneficial use of the people of Colorado, with the possible exception of the Juniper unit; is that correct?

Governor JOHNSON. Yes, that is correct. Juniper is a storage reservoir primarily to take the place of a storage reservoir known as Cross Mountain Reservoir. It is for storage, but it would provide for considerable irrigation, whereas Cross Mountain wipes out the largest irrigated area that we have in Moffat County, inundates it, covers it with upwards of 200 feet of water.

Senator KUCHEL. So to that extent the people of your State would object to Cross Mountain and urge in lieu thereof the Juniper unit?

Governor JOHNSON. Yes. The people in my State recognize that Cross Mountain is an excellent reservoir site and one that will hold more than 5 million acre-feet of water, will store more than 5 million acre-feet of water, while Juniper would store less than half that amount.

But we want to save our irrigated land out there as far as we can.

Senator KUCHEL. Yes, sir.

Now, Governor, if the Congress did not see fit to adopt the proposals which you have requested here, what would be your position on Senate bill 500 in its present form?

Governor JOHNSON. I would be terribly disappointed if the bill ignored Colorado completely for the reason that Colorado produces 72.18 percent of all the water in the upper Colorado River and to leave us out of the picture and make orphans of us is incomprehensible to me.

I am sure that this committee is not going to do that. So I am not going to cross that bridge until I have to.

Senator KUCHEL. Now, I would like next to refer to a public statement which you made in December of last year, a very frank statement, a statement which was read by many people in my State who believe that there was raised in it much that was of direct concern to California and to the lower basin, and I am sure, of course, that the views and conclusions which you reached in December 1954 in that statement continue to be your views and conclusions now.

Would that be correct, Governor?

Governor JOHNSON. It would be correct if you have the right understanding of the document. I prepared this document, as an inquiry.

As you know, Senator, I am not an attorney and I am not learned in the law—I am just a farmer from Craig—and I have some questions that I want answered and I have tried to get answers and have been unable to get them.

So I prepared this document and documented that with statements taken from the 7-State compact, the Boulder project or 6-State compact, and tried to get some answers and some consideration for the questions which I posed to them.

Senator KUCHEL. First of all, let me say that I am completely sure that I can speak for every man in the Senate who had the honor of serving with you that you are recognized as an able public servant and were recognized during your time in the Senate as one of the most able Members of the Senate and your views do have considerable impact on the thinking of this Senate committee and I am sure they would have the same impact upon the Senate as a whole.

I have tried in these hearings to read into the record some of the warning signals that have been raised with respect to the proposed legislation. I would like, on that point, to refer to your comments of last December and to read some of them.

For example, in part, your statement says:

> Either the seven-State compact specifically denies to the upper basin the right to withhold water which it cannot use for agricultural and domestic purposes or it does not deny us such a right. Either it denies to the upper basin the right to withhold water to develop power, or it does not deny us that right. Let us look at the document which has been ratified by the legislatures of seven States for the correct answers to these pertinent questions.
>
> Here is that irrevocable record:

"ARTICLE II

"(h) The term 'domestic use' shall include the use of water for household, stock, municipal, mining, milling, industrial, and other like purposes, but shall exclude the generation of electrical power.

"ARTICLE III

"(e) The States of the upper division shall not withhold water, and the States of the lower division shall not require the delivery of water, which cannot reasonably be applied to domestic and agricultural uses."

The Honorable Herbert Hoover, Secretary of Commerce of the United States, was appointed by the President to serve as chairman of the seven-State compact commission as the official representative of the Government of the United States, pursuant to an act of Congress. He was the chairman of the Colorado River Commission that drafted and signed the seven-State Colorado River compact.

In answer to the question propounded by Congressman Hayden, these points in the compact were interpreted officially by him on January 27, 1923, before any State had ratified the compact, as follows:

"Question 14. Can paragraph (d) of article III be construed to mean that the States of the upper division may withhold all except 75 million acre-feet of water within any period of 10 years and thus not only secure the amount to which they are entitled under the apportionment made in paragraph (a), but also the entire unappropriated surplus waters of the Colorado River?

"Answer. No. Paragraph (a) of article III apportions to the upper basin 7,500,000 acre-feet per annum. Paragraph (e) of article III provides that the States of the upper division shall not withhold water that cannot be beneficially used.

"Paragraph (f) and (g) of this article specifically leave to further apportionment water now unapportioned. There is, therefore, no possibility of construing paragraph (d) of this article as suggested.

"Question 19. Why is the impounding of water for power purposes made subservient to its use and consumption for agricultural and domestic purposes as provided in paragraph (b) of article IV?

"Answer. (*a*) Because such subordination conforms to established law, either by constitution or statute, in most of the semiarid States. This provision frees the farmer from the danger of damage suits by power companies in the event of conflict between them.

"(*b*) Because the cultivation of land naturally outranks in importance the generation of power, since it is the most important of human activities, the foundation upon which all other industries finally rest.

"(*c*) Because there was a general agreement by all parties appearing before the Commission, including those representing power interests, that such preference was proper.

"Question 20. Will this subordination of the development of hydroelectric power to domestic and agricultural uses, combined with the apportionment of 7,500,000 acre-feet of water to the upper basin, utterly destroy an asset of the State of Arizona consisting of 3 million horsepower, which it is said could otherwise be developed within that State if the Colorado River continues to flow, undiminished in volume, across its northern boundary line and through the Grand Canyon?

"Answer. (*d*) The compact provides that no water is to be withheld above, that cannot be used for purposes of agriculture. The lower basin will, therefore, receive the entire flow of the river, less only the amount consumptively used in the upper States for agricultural purposes."

Then in connection with this same problem your excellent statement goes on subsequently on page 5 of the mimeographed copy which I have:

If the upper basin States build storage reservoirs at the Glen Canyon and Echo Park sites as is now contemplated, the water withheld thereby will of necessity, be surplus water since the upper States cannot use it for agricultural or domestic purposes, and the upper States, therefore, must deliver such water to Mexico as is allocated to her under the provision of the seven-State compact.

Senator ANDERSON. Do I understand that this is a statement of Governor Johnson?

Senator KUCHEL. Yes; I was quoting the Governor's words there in that last paragraph.

Then on page 12, Governor, again your own language:

> I am compelled to keep emphasizing that whatever water is stored in the Glen Canyon and Echo Park Reservoirs will be surplus to the agricultural and domestic needs of the upper basin, and must be delivered to the lower basin to satisfy the award of 1,500,000 acre-feet to Mexico and 1 million acre-feet to the lower basin.
>
> Furthermore, should the lower basin require an additional supply of water for agricultural and domestic purposes the water stored in these reservoirs must be released.

On the basis of that comment, Governor, I first ask if those views of yours are the same today as when you gave them to the press in December of last year.

Governor JOHNSON. Those views are all in the nature of a question and I have not had the answer to that question. So the question is still bothering me.

This whole document is in the nature of a question and I am anxious to know the answer. I understand that the members of this committee do not feel that the questions have the merit which I gave them, but, nevertheless, I am still seeking answers to this whole document.

Now, I think that something should be said about Glen Canyon Reservoir. It is a tremendously valuable reservoir to the lower basin States. I have been told by students of the Colorado River that if the upper basin did not build Glen Canyon Reservoir that the lower States would have to build it.

Among other things it gives 500 years of additional life to Lake Mead and the Hoover Dam and Reservoir. It catches the silt and in that way gives it extended life. It would hold 26 million acre-feet of water and that would be an extremely valuable thing to Lake Mead and to the lower basin States for such a period as they are experiencing at the present time.

I understand that the water has hit a low in Lake Mead which has caused a loss in the power revenues from the Hoover Dam. It is a very valuable asset to the lower States.

What I am interested in is something of value to the upper States. Now, the only value that the upper States can get from Glen Canyon is the generation of power and it is thought by the sponsors of this plan that Glen Canyon can pay for its own construction in full and earn as much as $20 million a year that I am in hopes will be used for the construction of participating projects.

That is the only value that the upper States can get out of it, but it does give stability to the river; it certainly does make it easier for the upper States to fulfill their obligation of delivering 75 million acre-feet every 10 years to the lower States and it is a very valuable project in the control and stabilizing of the Colorado River.

But it is of great value to the lower States and I think that fact must be emphasized continually. I cannot understand for the life of me why the lower States and why California would be opposed to the construction and the building of Glen Canyon Reservoir.

I can only reach one conclusion: By California's continued opposition to the building of this great reservoir and that is that California does not agree with me and with the question that I asked, that they would have rights, that they could demand that the water in Glen Canyon might be released as surplus water.

They must not believe that. They must not agree with my contention. They must feel that there is no merit to my contention or they would not be so alarmed and so opposed to the building of a reservoir which can be of such tremendous advantage to the lower States and to the projects in the lower States below Lee Ferry.

Senator KUCHEL. You have broached the position of the people of Colorado in this question with great fairness and you have made certain statements with respect to the flow from Glen Canyon to Lee Ferry which I think are highly important to this committee.

But for one like yourself who would be free from the criticism that sometimes people of California are subjected to, one like yourself has raised these very questions in this statement which I feel from my own limited experience are correct, but the members of this committee deny that they are correct.

The other day, yesterday, we had a discussion here with respect to what the rights of the lower basin were under the compact and it is generally conceded that the compact is a relevant part of this whole controversy, but there was a dispute in this committee as to what rights the lower basin had under the compact.

When I read a portion of your comments and your belief with respect to the rights of the lower basin to water it was vigorously opposed by my good friend the chairman of the committee, who took violent exception to what you have stated and what it seems to me is the correct interpretation of the compact.

Here we are, Mr. Larson, an eminent engineer, and a man with a long and honorable service in the Department of the Interior. I asked him the question just exactly what the requirements on the Department of the Interior would be to deliver water from the Glen Canyon Dam. And I sensed that there was a desire on his part not to give me the full and fair answer here.

And all I am looking for, Governor, as a new member here, required to represent a State of 12 million people who I think in the main desire to be fair, all I am looking for is the answer on which this committee could, without bias, arrive at constructive legislation for the development of the upper Colorado River basin.

Governor JOHNSON. May I say, Senator, that is my desire, too, to get an answer, a clear-cut, straightforward answer.

Feeling as I do, and as my long and very careful study of the compact and the interpretation of the compact by former President Hoover, and other folks, including Delph Carpenter, who was Colorado's commissioner, and a very able man, reading their interpretations of the compact that they wrote and the compact that they negotiated, I just want to get the answers because I think it is important to the upper basin States that we have clear answers.

Now, apparently the committee and the water officials of the upper basin do not share my fears. I think I have done my duty when I call attention, as I have in this document, to interpretations and to provisions that I find in the seven-State compact. If it is their judgment that my contentions do not have merit, I am not going to feel badly about it.

As a matter of fact, I earnestly hope that I am mistaken, most earnestly hope. I earnestly hope that these fears that I have expressed here do not have much basis because I am as anxious as a per-

son can be to see the development of the upper basin continued and make progress.

Senator KUCHEL. Yes, sir; and I sincerely do, too. I think, like yourself, the questions which you have raised should have a complete exploration in this committee and should be answered fairly and in accordance with existing agreements among the States. I am sure you will agree with that statement.

Governor JOHNSON. Yes, sir.

I am not presuming, however, that the members of this committee have not given study to these contentions, I can't assume any such thing as that, whatever study that the contentions that I raise merit.

Senator ANDERSON. The Senator from California mentioned I took violent exception to it. I take violent exception to the contention that the upper-basin States get only what is left over; that all we must consider this is a document that guarantees to the lower basin States 7½ million acre-feet of water.

If the river gets down that low, over a long period every irrigation project already in existence has to dry up in order to take care of that demand.

I do not subscribe to that, and I am not ever going to subscribe to that. I do not believe you subscribe to it.

I at least can recall the discussions that took place in Santa Fe in 1922. I can recall some of the questions that I discussed at that time, at least as a newspaper reporter, with some of the people who were engaged in the drafting of this document.

I recall that Colorado, for example, was represented by one of the ablest men we ever knew in water matters, Delph Carpenter. He was regarded as a giant among all the people who were there because of his great experience.

Appended to Delph Carpenter's statement were his estimates as to the flow of the river, 20,500,000 acre-feet. There was not anyone there in that group originally dividing up the water who did not believe there was a safe margin over and above the 15 million acre-feet that both the upper and lower basins could safely take out 7 million feet and there would then remain several million acre-feet of water.

Delph Carpenter's figures on surplus is 4½ million acre-feet. There were claims that the Colorado would flow 25 million acre-feet, but the average would be at least 20 million acre-feet.

Everyone thought they were going to do it. On the question of storage, the question was asked President Hoover as to what his understanding was on that subject as well, and he said that the future development of the Colorado River Basin is dependent wholly upon the creation of storage. If it was not contemplated that things like Glen Canyon Dam and Echo Park site and Flaming Gorge would be constructed in the upper-basin States, certainly the chairman of the committee and subsequently the President of the United States, would have never said that the future development of the Colorado River Basin is dependent wholly upon the creation of storage.

We all know that to be the fact. If we do not have storage in the upper basin States, then, of course, you are saying in effect that there is no proper division of the water; that certain people have vested rights and other people do not have rights, and I cannot believe that was the purpose of the compact.

It starts off by trying to say that it is to divide the waters. If you take the position that certain peoples' rights are firm and all other rights are subject to that, that we are only the residuary legatees, we get whatever might be left, then they should never have started off by saying in article III:

> There is hereby apportioned from the Colorado Basin in perpetuity to the upper basin and the lower basin, respectively, the exclusive beneficial consumptive use of 7,500,000 acre-feet of water per annum.

If they were not going to do that they should have started off by saying the lower basin should be given 7½ million acre-feet; the upper basin has everything that is left and everything above that.

It is a little hard to translate these documents anyway. There is certainly no one that I know anything about who was in the Santa Fe compact of 1922 who did not think there was more water in the river than had then been divided, or they would not have gone through the meaningless thing of suggesting that sometime 40 years from then they would divide up the rest of the water in the river.

Governor JOHNSON. It is certain they overestimated the amount of water that would be produced in the river. There can't be any question of that.

We have had 26 consecutive years now in which the flow of the river has been subnormal. Of course, whether they made a mistake in overestimating it, or not, they wrote some binding conditions in the compact. We have to be governed by all of the conditions that are in the compact and not just those parts of the compact that we like.

For instance, here is (d) in article III. It states:

> The States of the upper division will not cause the flow of the river at Lee Ferry to be depleted below an aggregate of 75 million acre-feet for any period of 10 consecutive years reckoned in continuing progressive service beginning with the 1st day of October next suggesting the ratification of this compact.

Now, it seems to me that that paragraph does give the lower States a priority to their part of the division.

Senator ANDERSON. Yet, at the same time, they were all willing to concede it did not give them a priority.

Governor JOHNSON. I cannot interpret it in any other way in reading this language.

It seems to me this language is pretty straight from the shoulder and very expressive and makes that actual statement.

Now, it says that they—

> will not cause the flow of the river at Lee Ferry to be depleted below an aggregate of 75 million acre-feet for any period of 10 consecutive years reckoned in continuing progressive service beginning with the 1st day of October next suggesting the ratification of this compact.

Now, the fact that they overestimated the flow of the river explains how they happened to make that kind of mistake, if it is a mistake, but certainly we are bound by it. We are bound by paragraph (d) the same as we are bound by all other parts of this compact, it seems to me, and we can't go through there and pick out parts of it that we like and reject parts of it that we don't like. We have to take it all.

Senator ANDERSON. I agree with that. I only say that the point of the compact was an attempt to divide equitably the waters of the

river and any division which gives Colorado and Arizona all the water and gives the upper basin States none, is not an equitable division.

Governor JOHNSON. The way I understand the division that was made of the water, it is that the first 75 million acre-feet must go to the lower States.

Then the upper States get their 75 million or so much of it as is produced.

Then the lower States get an additional 1 million.

Then after that any waters above the waters that have been allocated to the lower States plus the waters that have been allocated to Mexico, plus the 1 million acre-feet, become surplus water.

Whenever the lower States or the upper States put to beneficial use all of their share of the water in the river, then a review can be had of the compact and they can make a further division of the surplus water.

Senator ANDERSON. But, Governor, the section you refer to, the 1 million acre-feet of water, was supposedly—I think there is some argument about this, of course, but I think it was the Gila River. I think it was clearly understood by everybody at the time.

Notice the difference in language:

> In addition to the apportionment in paragraph (a), the lower basin is hereby given the right to increase its beneficial consumptive use of such waters.

There is no guaranty of any additional water out of the river. If they were able to develop water out of the Gila or by return flow they would be able to increase their beneficial consumptive use. No one here raises the question of what happens in the case of water allotted to the Indians. Is that charged against the stream before the division or does it come afterward? This is a very important question.

Governor JOHNSON. My understanding of that, and as I say, my interpretation, may be completely in error, but as I understand it, the reason for the different language with respect to that million—it has two purposes:

One, that it does not have a priority on the upper States;

Two, that it does not have a cumulative effect because that is what President Hoover said in his interpretation, on page 5, question 6, and I think this is still a question by Congressman Hayden at the time:

> Question 6. Are the 1 million additional acre-feet of water apportioned to the lower basin in paragraph (b) of article III supposed to be obtained from the Colorado River or solely from the tributaries of that stream within the State of Arizona?

Now, he does not use Gila River.

Senator ANDERSON. Which question was that?

Governor JOHNSON. That is question 6 in the middle of page 6.

Congressman Hayden, now Senator, couldn't have couched his question stronger if he had used the Gila River. He said:

> Are the 1 million additional acre-feet of water apportioned to the lower basin in paragraph (b) of article III supposed to be obtained from the Colorado River solely from the tributaries of that stream within the State of Arizona?

The answer comes clear as a bell from President Hoover, former President Hoover:

> The use of the words "such waters" in this paragraph clearly refers to the waters from the Colorado River system——

Senator ANDERSON. "System," that is the word to emphasize.

Governor JOHNSON (reading):

> Colorado River system, and the extra 1 million acre-feet provided for can therefore be taken from the main river or from any of its tributaries.

Senator ANDERSON. If they happen to have a period of great excess they can increase their beneficial use 1 million acre-feet. If they could not get it out of the main stream they could go down to the Gila and take it out of that source. That is unquestionably going to be a matter of controversy when this matter gets to the Supreme Court.

All I object to is the steady implication that nobody has any water rights except the lower basin States; that your great State of Colorado, that is the roof State that contributes 72 percent of all this water, cannot use any water until it is able to persuade California or some other State to let them get a project through the Congress to use a little bit of it because we have to make sure to guarantee their 7½ million acre-feet of water and 1 million acre-feet of water and 1½ million acre-feet of water to go to Mexico.

Governor JOHNSON. No; I tried to point out that the million extra acre-feet of water that is awarded to the lower basin does not have a priority over the upper basin States.

Senator ANDERSON. The Mexican treaty water does.

Governor JOHNSON. The Mexican treaty water does.

We have to dig up half of that. And if we have any surplus waters in the river the Mexican treaty has to be satisfied out of the surplus water.

Senator ANDERSON. Well, 7½ million plus 1½ million acre-feet of Mexican treaty water comes to 9 million acre-feet. You can check the flow year after year and none exceeds 9 million acre-feet.

I am sure we cannot assume that the purpose of the compact is to make sure that the lower basin States and the Republic of Mexico got that water and the States of Colorado, Wyoming, and Utah cannot use any of this. That is not an equitable division.

Governor JOHNSON. The Mexican demand is divided between the upper States and the lower States and the lower States have to pay half of that out of their 7,500,000 acre-feet. That comes right out of that.

The upper States have to deliver at Lee Ferry their half of Mexico's one and a half million acre-feet under the terms of the compact. They have to deliver that at Lee Ferry in addition to the water that they deliver for the lower States.

I think the compact is very clear on that, but if there is any surplus water—and Mr. Hoover answered the question in that way when it was propounded to him—if there is any surplus water Mr. Hoover says the burden does not fall on anybody. He says then it will be paid out of the surplus.

Senator BARRETT. Mr. Chairman, might I ask a question?

Senator ANDERSON. Surely, Senator Barrett.

Senator BARRETT. I am a little bit confused, Governor Johnson, about some of the statements you have made here today. I would like to get some information on the subject.

Let me ask you if it is your position that in the event we run into an extremely dry series of years where the water of the Colorado goes down as low as the lowest point of something over 4 million

acre-feet a year, then is it your position that under the compact all of that water belongs to the lower basin States?

Governor JOHNSON. No; it is not my position. I do not have any position, but the compact does have a position and the compact says that in a 10-year period 75 million acre-feet must be delivered at Lee Ferry, and 1 year they might not deliver as much water, but they have to deliver an aggregate of 75 million acre-feet in a 10-year period.

Senator BARRETT. I have been somewhat impressed with the statement that the chairman made that undoubtedly these representatives of the various States when they met at Santa Fe in 1922 thought they were making a 50–50, or an equitable division of the waters between the upper basin States and the lower basin States.

So I want to ask you this question; it disturbs me a little bit as far as Wyoming is concerned: We are making beneficial use of 250 thousand acre-feet of water in Wyoming at the present time. Those water rights were established shortly after the turn of the century, 20 years before the Santa Fe compact. They have been in force ever since. They were established under Interior.

Nobody questions the validity of those water rights.

Now, in the light of that fact——

Governor JOHNSON. Not even the 6- or 7-State compact does it, either. It says that water belongs to them. The compact says that.

Senator BARRETT. That is right, the compact says that precisely.

Governor JOHNSON. That is exactly right. The water rights that were adjudicated, the water rights that were in use prior to the compact belong to the people who have that ownership, who own those water rights.

Senator BARRETT. That is right, and the same thing applies to the citizens of all the upper basin States.

Governor JOHNSON. That is right, everybody in the upper basin States and everybody in the lower basin States.

Senator BARRETT. So then the compact did not mean that the lower basin States were entitled to all the water in the event there was just enough to meet this 75 million acre-feet in a 10-year period?

Governor JOHNSON. No, sir; it did not have anything to do with the water rights that had been established prior to the time when the compact went into effect.

Senator BARRETT. So then the Commissioners at Santa Fe knew all this, they were writing the compact with that very thought in mind, and they were endeavoring to make an equitable division of all the waters in the basin and they did not mean to give any guaranty, strict unalterable guaranty to the lower basin States?

Governor JOHNSON. They certainly did not include the water rights that were already established, they did not include any of them, but they did include and they did say very specifically that the upper States had to deliver 75 million acre-feet to the lower States.

Senator BARRETT. Now, the provision in the compact, article VIII says:

> Present perfected rights to the beneficial use of waters to the Colorado River system are unimpaired by this compact.

Governor JOHNSON. That is right.

Senator BARRETT. That is section VIII. Of course, the compact was ratified and approved in 1928, December 31.

Governor JOHNSON. Yes, sir.

Senator BARRETT. So these rights are valid; they have been valid since then. They were for years before that.

Governor JOHNSON. That is right. The compact says that.

Senator BARRETT. That is right.

So it seems to me that that is wholly inconsistent with the position that apparently you are taking here, Governor——

Governor JOHNSON. I am not taking any position. I am reading the language of this compact.

If you are satisfied that in article III that (d) does not mean what it says, that is all right. I have no argument on that.

I know what it says, and so do you.

Now, if (d) does not mean that, why that ought to be a lot of comfort.

Senator BARRETT. My answer to that, Governor Johnson, is this: That the people of Colorado were represented by authorities in water law. We had some representatives in Santa Fe from Wyoming that we considered to be topnotch men in water litigation and water law, and I do not think they would have been so foolish as to go down to Santa Fe and agree to any division except a fair division of the waters of the Colorado River.

I think they got precisely what they asked for and California and Arizona and the lower States agreed to divide it up on a fair, equitable basis, which was about 50–50.

Senator ANDERSON. Let me point out to the Senator from Wyoming that if you take the year 1931 where the average flow at Lee Ferry ran 7,769,000 acre-feet and carry it for a 10-year period from then, that the average flow was under 10 million acre-feet.

Now, if the guaranty means that we will always deliver 7½ million acre-feet to the lower basin—take the 75 million for 10 years, that averages down below 10 million acre-feet—if that means we must always deliver 7½ million acre-feet plus half the Mexican water, certainly we have to deliver that; that is 750,000 acre-feet more.

That is 8,250,000 acre-feet, the regular depletion of the stream already is over 2½ million acre-feet.

So you would have to cut off the existing water projects in Colorado, Wyoming, and Utah and New Mexico which had water rights which have been there for a hundred years.

Governor JOHNSON. They have been there a hundred years, but the compact says you don't have to cut them off.

Senator ANDERSON. Where does it say that?

Governor JOHNSON. It says that in article VIII.

Senator ANDERSON. But you have been reading to me this delivery and saying it is the only binding thing in it. I say it is not the only binding thing in it. It is only one of the many conditions.

Governor JOHNSON. That is right, but it is one of the conditions.

Senator ANDERSON. The first condition is an equitable distribution of the water of the river.

Governor JOHNSON. Well, if you can get comfort out of believing that the compact does not mean what it says, why, that is wonderful.

Senator ANDERSON. I get comfort in believing that it was intended to divide the waters of the river equitably and in time we will get that done. I do not know how long it will take, but it will work out, I hope.

Governor JOHNSON. I am for you all the way on the intention.

Colorado's representative, Delph Carpenter, is a revered name in Colorado, a man in whom the people had complete confidence. He was considered one of the great water experts of all time, not only by Colorado, but by all of the Western States. He was a party to this compact and where they made a mistake, if they did make a mistake, was in overestimating the amount of water in the river.

Senator ANDERSON. I may say, Governor, that I agree thoroughly with everything you say about him. My memory may be playing me tricks, but it did seem to me that in the discussions of that time that he outlined the difficulties that States had over the flow of water across their borders. It seemed to me that Colorado had been litigating with Nebraska prior to this time and he was filled with the very subject of making guarantees.

I am confident that many of the people who were there felt that there was a shortage to the upper-basin States; they would not sacrifice their rights.

The representative of New Mexico in that matter was a lawyer named Stephen B. Davis, Jr., who proved to be such a very capable lawyer that Mr. Hoover took him east with him. When he could not sell him into the service of the Government he planted him in a very large law firm in New York City at a tremendous salary because he was an extremely capable man.

People who represented the Roof States were of that caliber.

It is hard for me to believe that they would have completely sold our rights to the water in the Colorado River by the guaranties that they set up on the delivery of 75 million acre-feet.

I admit that the compact sounds bad in that one sense, but also it is based on a desire for an equitable distribution.

Senator KUCHEL. I would like to read into the record the statements of Governor Johnson on this general question which you have raised, observing, if you will let me do so parenthetically, that I am glad to quote a past Senator and the present Governor of one of the States in the upper basin.

I quote now from the Governor's statement:

> The upper and lower basins were each apportioned from the Colorado River system the exclusive beneficial consumptive use of 7,600,000 acre-feet of water per annum, and in addition the lower basin was given the permission to increase its beneficial consumptive use of an extra million acre-feet per annum of surplus water. However, the 7,500,000 acre-feet awarded to the lower States had a very clear priority over the 7,500,000 acre-feet awarded to the upper States.
>
> In reality, the compact gave the lower States 7,500,000 acre-feet of water per annum and the upper States that much water if there should be any water left in the river, provided the upper States used that water only for domestic or agricultural purposes.
>
> (a) There is hereby apportioned from the Colorado River system in perpetuity to the upper basin and to the lower basin, respectively, the exclusive beneficial consumptive use of 7,500,000 acre-feet of water per annum, which shall include all water necessary for the supply of any rights which may now exist.
>
> (b) In addition, to the apportionment in paragraph (a) the lower basin is hereby given the right to increase its beneficial consumptive use of such waters by 1 million acre-feet per annum.
>
> But here is the catch in this award:
>
> (d) The States of the upper division will not cause the flow of the river at Lee Ferry to be depleted below an aggregate of 75 million acre-feet for any period of 10 consecutive years reckoned in continuing progressive series beginning with the 1st day of October next succeeding the ratification of this compact.

As I think you just said, Governor, that the interpretation which you gave that wording of the compact is the same now as it was when you made the statement in December.

Governor JOHNSON. Yes. The quotes that I make from the compact, that is my contention. Anything that you have read of my statements does represent my contention.

I hope that my contention is not correct and simply because I contend it is no evidence that it is correct.

As I say, I hope that I am wrong. I wish there was some way that I could rub out all reference to paragraph (d) in article III.

I would like to get that. It would make me very happy if I could.

Senator KUCHEL. The reason I read that into the record, Mr. Chairman, is because it does raise a point. There is a cleavage in this committee, a very one-sided cleavage, but here is the considered judgment of a person who is qualified to render an opinion and which I think pretty sharply indicates that any developments such as is contemplated in S. 500 must rely upon accurate legal interpretation of the rights and responsibilities under the compact because, and I shall not belabor the point at all, you have been most generous with me in letting me, not even a member of the subcommittee, ask questions, both yesterday and today.

The chairman, perfectly reasonably, has reached a conclusion diametrically opposite that which the Governor of Colorado and the Junior Senator from California believes is the clear and express understanding arrived at in the compact, article III, subsection (b).

Governor JOHNSON. I hope most sincerely that the chairman is correct.

Senator ANDERSON. You recognize, of course, that when a man is not a lawyer he has no difficulty whatever in interpreting the law.

Senator BARRETT. I would like to ask the Governor if he really feels that subsection (d) is a strict limitation on subsection (a).

Governor JOHNSON. Yes, I think that all of those subsections, that all of those sections are of equal importance. I don't think that you can say that (a) has any more authority than (d) or (e) or (f). I think each one of them has to stand on its own.

There is no conflict between (d) and (a).

Senator ANDERSON. Yes, this is not an equitable distribution if (d) keeps them from getting any water at all.

Senator BARRETT. As I understand your position, Governor, you contend that subsection (d) is a strict limitation and a modification of subsection (a)?

Governor JOHNSON. No, I don't think there is any conflict between (a), (b), (c), and (d). I think each one of those provisions, each one of those paragraphs, is binding, equally binding.

Senator BARRETT. Do you mean to say that both the upper basin and the lower basin are each entitled to the 7½ million acre-feet then as outlined in subsection (a)?

Governor JOHNSON. No; I think that each one of them has been allocated in perpetutity 7,500,000 acre-feet per annum, but I think that (d) says we must deliver to the lower States 75 million acre-feet over a conservative 10-year period.

Senator BARRETT. If you take that position, must you not also take the position, then, that that limitation in subsection (d) also limits the

last sentence, or the last section, rather, of subsection (a), which states:

> Which shall include all water necessary for the supply of any rights which may now exist.

You cannot limit one part of it without limiting the other.

Governor JOHNSON. That does not follow at all. We have compacts in Colorado, unfortunately. We have compacts with New Mexico that did not protect the existing water rights in Colorado.

We have them on the Conejos River and on the Rio Grande River. They did not protect the existing rights.

In those cases the Supreme Court of the United States has decided that the compact is the authority. That is the way they have decided it.

But in this compact, very carefully, and thanks to Delph Carpenter and the other wise men who were writing the compact, they did not go back of the existing water rights any time, any place.

Senator BARRETT. As I take it, then, your position, Governor, is that the upper basin States will get a guaranty of their water rights as of the date of ratification of the compact; lower basin States have a guaranty of everything else.

Governor JOHNSON. That is not quite correct. My belief is, and I get that belief from reading the compact very carefully, that the first priority is the existing water rights at the time when the compact was signed. That is the first priority.

The second priority in the 10-year cycle is that the lower States are entitled to have delivered at Lee Ferry 75 million acre-feet of water.

The third priority is that the upper States then get 75 million acre-feet of water.

I should have been talking about years because I am running into difficulty now.

Then the fourth priority is the million acre-feet of water that has been given to the lower States per annum.

Senator BARRETT. Governor, I have great confidence——

Governor JOHNSON. Please don't have confidence in me, but I hope you have confidence in the printed word and in the interpretation of the men who negotiated this compact.

Senator KUCHEL. I join you in that hope.

Senator BARRETT. Let me conclude my statement. I have great confidence in the Governor of Colorado. He is ordinarily a very sound individual.

In this respect I cannot understand how you could conclude that the fine people from the Upper Basin States who negotiated this compact at Santa Fe, attempted to get a fair and equitable share of the waters of the Colorado River, yet the only guaranty they came out with was the vested water rights which they didn't need anybody at the Santa Fe compact to guarantee. They had them.

They did not have to have anybody say you can keep your water rights, that nobody can take away from you.

Governor JOHNSON. That is what I thought and that is what the Supreme Court of the State of Colorado thought and they rendered that kind of decision on the compact between Colorado and New Mexico on the rivers, on the Conejos and Rio Grande Rivers.

But when the Supreme Court of the United States got it, they said, "No, you didn't reserve those water rights."

Now, in this case the water rights were reserved. In the other case, the compact between New Mexico and Texas and Colorado, the water rights were not reserved to the person who got them.

That is just a matter of history. That is the way the Supreme Court decided.

Senator BARRETT. I hope the Supreme Court will look at it differently in this case. I am sure they would. If they do not, if somebody would come into the State of Wyoming and say, "Listen, these water rights which you have established since 1900 are no good." I have an idea that the Governor of Wyoming would call out the militia to protect the water rights.

Governor JOHNSON. They are not going to have to do that because nobody is going to say that to Wyoming because the water rights are protected in this compact.

Senator ANDERSON. But the contention is that anything acquired after 1922 is not protected in this compact.

Governor JOHNSON. After 1922 it is not protected.

Senator KUCHEL. Let me just ask the Senator, what meaning do your read into this subsection (d) of article III? What possible interpretation other than the plain impact of that language can you read into it?

Senator BARRETT. I read into that this language, that the upper basin States are entitled to an equitable share of the water of the Colorado River and it was intended at that time that both the upper basin and the lower basin intended that we get storage projects in the upper basin so that we would not interfere with your 75 million acre-feet at Lee Ferry over a 10-year period.

If you will let us get those projects constructed up there so that we can store the water, you will have your 75 million acre-feet.

Senator KUCHEL. I am just asking here what does this language mean:

> **The States of the upper division will not cause the flow of the river at Lee Ferry to be depleted below an aggregate of 75 million acre-feet for any period of 10 consecutive years.**

You did not write this compact. I did not write it, nobody around this table did, but the States involved all agreed to it. That is part of the language of the compact.

It does seem to me that the interpretation that has been put on it by the Governor of Colorado is the only one that can be.

Senator BARRETT. The Governor of Colorado and the junior Senator from California certainly would not contend that there was any guaranty that there is going to be 75 million acre-feet delivered at Lee Ferry if there was not that much water in the river.

Senator KUCHEL. If an act of God prevented it, I will agree with that.

Senator BARRETT. No. 2: You certainly know that when those irrigation people were meeting at Santa Fe in 1922, they were talking about building reclamation projects and building storage dams all over the upper basin and the lower basin, too. They had that very thing in mind that if and when that was done, that there would be no difficulty in our getting the 75,000,000 acre-feet apportioned to us and

the lower basin getting 75 million acre-feet over a 10-year period plus these other commitments you spoke of.

Senator KUCHEL. I say to my good friend all I know is that we do have a compact and I think I would not be worth my salt if I did not try as best I can to sit here and urge this Senate committee to see that any legislation it approves is not in derogation of a compact that was entered into by the States involved.

Senator BARRETT. Certainly you will agree, Senator, that if the storage dams are built in the upper basin the upper basin States will be in a much better position to deliver the 75 million acre-feet over a 10-year period at Lee's Ferry.

Senator KUCHEL. It may well be, and again I speak not as an engineer; I speak as a lay Senator, it may well be that there is a great deal of merit in what you say.

I am here merely trying to explore the situation.

Senator BARRETT. I thank the Senator for permitting me to interlope and ask a couple of questions.

Senator KUCHEL. Governor, without endeavoring to develop the whole answer to this question, if a dam were constructed at Glen Canyon whose capacity would be 26 million acre-feet of water, is it not true that the water which would be accumulated in that dam would have to be charged under the compact to certain States in the upper Colorado River Basin.

Governor JOHNSON. It would be presumed that the water belonged to them. We are presuming now that they made the delivery of 75 million acre-feet in a 10-year period and 7,500,000 acre-feet each year and that they have complied fully with the demands of Mexico and then the waters in Glen Canyon, it is presumed by this committee, anyway, that that water belongs to the upper basin States.

Senator KUCHEL. We would have to presume, though, would we not, Governor, that that water would not be used for irrigation or domestic purposes in the upper States?

Governor JOHNSON. That is right; water that is in Glen Canyon Dam cannot be used for agriculture or domestic purposes by the upper States. They cannot possibly use it.

Senator KUCHEL. Because it is too far down in a geographical situation which would render that absolutely impossible?

Governor JOHNSON. Yes, it is only 15 miles from Lee Ferry.

Senator WATKINS. May I ask you a question at that point: You understand, do you not, that by storage of water in Glen Canyon Reservoir that we would then be able to take water from the tributaries, higher up in exchange for the water we stored down there which we would release so that we would not deplete the stream below 75 million acre-feet in a 10-year period?

Governor JOHNSON. Yes, if the lower States would cooperate and not demand the water and not put to beneficial use and not demand it, and I think that Glen Canyon is extremely in the interest of the lower States. I cannot believe that they would not cooperate fully in wanting the water held there.

Senator WATKINS. We would have the right to store it so that we can take out from the tributaries higher up by exchange an equivalent quantity of water we have stored down there in order to make those deliveries which would permit us to take the waters higher up for our

use. So in effect, the actual effect of storing down there is to make it possible for us to get the water to make up our allotment under the compact.

Governor JOHNSON. The exchange of water is an old practice in irrigation, as the Senator very well knows.

Senator WATKINS. I wanted to point out that when we say we don't actually take any water out of the dam, we do not physically take the water that is in that dam, but we take a similar quantity of water from the river and use in exchange there in place of the water we can deliver.

In other words, California is not being hurt if we release to them that quantity of water to make up the commitment of 75 million acre-feet in 10 years.

Governor JOHNSON. They are not injured. They are greatly helped.

Senator WATKINS. That is right.

Senator KUCHEL. I would like to ask the chairman's consent to place in the record the entire statement of the Governor of Colorado.

Senator WATKINS. That is of December 20, 1954?

That is so-called press release he made?

Senator ANDERSON. I have no objection to that.

Governor Johnson is here and he might be asked.

Senator KUCHEL. Would you then, Governor, offer a copy of your statement in December?

Governor JOHNSON. I would offer a copy of my statement with this preface that what I am raising is a question. And I want to say also that I have tried to get an answer to this question before I wrote this document. I tried diligently to get the answers to it from the Reclamation Bureau and they did not give it to me. So I wrote this document and documented it, as you note, from statements and interpretations of the folks who negotiated it and from the terms and the provisions of the 7- and 6-State compacts and it is still in the form of a question. The question that I was trying to ascertain is, when does the water in Glen Canyon become surplus?

Senator KUCHEL. And none of the questions you have raised, Governor, have yet been answered?

Governor JOHNSON. They have not been officially answered. Senator O'Mahoney came closer to answering them than anyone. I have submitted them to him and he does not agree with me, and I have great respect for Senator O'Mahoney, but there are very few lawyers that have come up with a yes-and-no answer.

With that preface then and with the understanding, and I hope it is understood by this committee and by everyone that this document I have here is a question, and I put it in the form of a contention because I want to be shown where I am in error, because I think this is a very serious matter, with that kind of interpretation on this document, I ask unanimous consent that it may be inserted in the record.

Senator ANDERSON. Thank you, Governor.

Then do I understand that you wrote this as an exploratory document seeking to find out the answers to these questions?

Governor JOHNSON. Completely correct.

Senator WATKINS. It is not a contention on your part that that is the law, and that is the interpretation?

Governor JOHNSON. I am trying to get the answers to it. I am trying to find out whether that is the law or not. It is an exploratory document.

Senator ANDERSON. The document will be placed in the record at this point.

(The document referred to follows:)

STORAGE BELOW THE STATE OF COLORADO IS NOT THE ANSWER

(By Ed C. Johnson, Former United States Senator, Colorado)

Interested persons on the eastern and western slopes of Colorado have expressed confidence in me, as Governor, to resolve the very controversial water problem that plagues both slopes. This is a tremendous responsibility and challenge but its vital nature demands my acceptance. Accordingly, I shall do my utmost to work out something which will benefit both slopes and injure neither.

However, before we begin the task of allocating Colorado's share of the water of the Colorado River system, we first must take stock of the quantity and the location of the water that is available to us.

There are very serious misconceptions, widely held, in regard to the burdens placed on this State by the specific provisions of the seven-State compact and the official interpretations with respect to them. These limitations should be understood clearly by all parties concerned, since they are basic to any plan to develop the upper Colorado River Basin. It is with that purpose in mind that I have prepared this document. If my conclusions are in error, I want to be shown wherein the error lies.

Either the seven-State compact specifically denies to the upper basin the right to withhold water which it cannot use for agricultural and domestic purposes or it does not deny us such a right. Either it denies to the upper basin the right to withhold water to develop power, or it does not deny us that right.

Let us look at the document which has been ratified by the legislatures of seven States for the correct answers to these pertinent questions.

Here is that irrevocable record:

"ARTICLE II

"(h) The term 'domestic use' shall include the use of water for household, stock, municipal, mining, milling, industrial, and other like purposes, but shall exclude the generation of electrical power.

"ARTICLE III

"(e) The States of the upper division shall not withhold water, and the States of the lower division shall not require the delivery of water, which cannot reasonably be applied to domestic and agricultural uses."

The Honorable Herbert Hoover, Secretary of Commerce of the United States, was appointed by the President to serve as Chairman of the Seven State Compact Commission as the official representative of the Government of the United States, pursuant to an act of Congress. He was the Chairman of the Colorado River Commission that drafted and signed the seven State Colorado River compact.

In answer to the question propounded by Congressman Hayden these points in the compact were interpreted officially by him on January 27, 1923, before any State had ratified the compact, as follows:

"Question 14. Can paragraph (d) of article III be construed to mean that the States of the upper division may withhold all except 75 million acre-feet of water within any period of 10 years and thus not only secure the amount to which they are entitled under the apportionment made in paragraph (a), but also the entire unapportioned surplus waters of the Colorado River?

"Answer: No. Paragraph (a) of article III apportions to the upper basin 75 million acre-feet per annum.

"Paragraph (e) of article III provides that the States of the upper division shall not withhold water that cannot be beneficially used.

"Paragraph (f) and (g) of this article specifically leave to further apportionment water now unapportioned. There is, therefore, no possibility of construing paragraph (d) of this article as suggested.

"Question 19. Why is the impounding of water for power purposes made subservient to its use and consumption for agricultural and domestic purposes as provided in paragraph (b) of article IV?

"Answer: (a) Because such subordination conforms to established law, either by constitution or statute, in most of the semiarid States. This provision frees

the farmer from the danger of damage suits by power companies in the event of conflict between them.

"(b) Because the cultivation of land naturally outranks in importance the generation of power, since it is the most important of human activities, the foundation upon which all other industries finally rest.

"(c) Because there was a general agreement by all parties appearing before the commission, including those representing power interests, that such preference was proper.

"Question 20. Will this subordination of the development of hydroelectric power to domestic and agricultural uses, combined with the apportionment of 75 million acre-feet of water to the upper basin, utterly destroy an asset of the State of Arizona consisting of 3 million horsepower, which it is said could otherwise be developed within that State if the Colorado River continues to flow, undiminished in volume, across its northern boundary line and through the Grand Canyon?

"Answer. (d) The compact provides that no water is to be withheld above, that cannot be used for purposes of agriculture. The lower basin will therefore receive the entire flow of the river, less only the amount consumptively used in the upper States for agricultural purposes."

On December 15, 1922, Hon. Delph E. Carpenter, commissioner for Colorado, reported to Governor Oliver H. Shoup, his analysis of this compact which he helped to formulate. His comments and observations are especially pertinent. In this official report he said:

"Power claims will always be limited by the quantity of water necessary for domestic and agricultural purposes. The generation of power is made subservient to the preferred and dominant uses and shall not interfere with junior preferred uses in either basin."

On March 20, 1923, Delph E. Carpenter in a joint letter to Colorado Senator M. C. Bashor, and Colorado Representative Royal W. Calkins, said, among other things:

"All power uses in both basins are made subservient to the use and consumption of such water for agricultural and domestic purposes and shall not interfere with or prevent use for such dominant purposes."

The interpretation of Hon. W. S. Norviel, commissioner for Arizona, published January 15, 1923, contains this language:

"The third principle established by the compact was to fix at a time when the remainder of the water unalloted and unused might be apportioned.

"The fourth principle fixes a preference in agricultural uses over power.

"The fifth principle, that the upper States shall not withhold water that cannot be reasonably applied for agricultural uses."

Senator Hayden, Arizona, propounded 19 questions to Hon. A. P. Davis, Director, United States Reclamation Service, to which the Director made the following replies on January 30, 1923:

"Question 10. Is it true that, if the Colorado River compact is adopted, all of the water that Arizona will ever get out of the main river will be enough to irrigate only 280,000 acres of land, of which 130,000 acres are now embraced in the Yuma project and 110,000 acres in the Parker project?

"Answer. The Colorado River compact does not attempt to divide the water of the river between individual States. Except for rights already initiated by California and Nevada, there is nothing in the compact that will prevent the State of Arizona from taking from the river all the water that it can put to beneficial use.

"Question 19. Any further comment that you may care to make relative to the approval of the Colorado River compact by the Arizona State Legislature will be appreciated.

"Answer. The Colorado River compact provides that the lower basin shall be guaranteed an average of 75 million acre-feet of water annually from the upper basin and all of the yield of the lower basin, and that any water not beneficially used for agricultural and domestic uses shall likewise be allowed to run down for use below."

It should be noted that these official interpretations were made before the compact was ratified by any State except Nevada and were not disputed by Colorado or any other State at the time it ratified the compact. Most certainly we are bound hand and foot by them.

At the time the seven-State compact was adopted and ratified, it was contemplated that a treaty would be negotiated later between the United States

and Mexico which would allocate to Mexico certain quantities of water defined in acre-feet, out of the Colorado River system.

Furthermore, it spelled out just how that burden should fall upon the lower basin and the upper basin.

The contract specified that to the extent there is surplus water in the Colorado River system, such surplus water would be utilized and the balance of the burden would be shared equally by the upper and lower basins.

"ARTICLE III

"(c) If, as a matter of international comity, the United States of America shall hereafter recognize in the United States of Mexico any right to the use of any waters of the Colorado River system, such waters shall be supplied first from the waters which are surplus over and above the aggregate of the quantities specified in paragraphs (a) and (b), and if such surplus shall prove insufficient for this purpose, then, the burden of such deficiency shall be equally borne by the upper basin and the lower basin, and whenever necessary the States of the upper division shall deliver at Lee Ferry water to supply one-half of the deficiency so recognized in addition to that provided in paragraph (d).

"(d) The States of the upper division will not cause the flow of the river at Lee Ferry to be depleted below an aggregate of 75 million acre-feet for any period of 10 consecutive years reckoned in continuing progressive series beginning with the first day of October next succeeding the ratification of this compact."

If the upper basin States build storage reservoirs at the Glen Canon and Echo Park sites as is now contemplated, the water withheld thereby will of necessity be surplus water since the upper States cannot use it for agricultural or domestic purposes, and the upper States, therefore, must deliver such water to Mexico as is allocated to her under the provision of the seven-State compact.

Senator Hayden asked Chairman of the Commission, Herbert Hoover, about this, and was answered as follows:

"Question 15. Does paragraph (d) of article III in any way modify the obligation of the States of the upper division, as expressed in paragraph (c), to permit the surplus and unapportioned water to flow down in satisfaction of any right to water which may hereafter be accorded by treaty to Mexico? Within any year of a 10-year period, could the States of the upper division shift to the States of the lower division the entire burden of supplying such water to Mexico?

"Answer. (*a*) No. It is provided in the compact that the upper States shall add their share of any Mexican burden to the delivery to be made at Lee Ferry, whenever any Mexican rights shall be established by treaty. By paragraph (c) of article III, such an amount of water is to be delivered in addition to the 75 million acre-feet otherwise provided for.

"(*b*) In the face of the specific provision of article III (c) that the burden of any deficiency must be 'equally borne,' I can see no possibility of placing upon the lower division the entire burden. If the surplus is sufficient, there is no burden on anyone. If it is insufficient the plain language is that it must be equally shared, with the equally plain provision that the upper division must furnish its half."

Delph Carpenter, in his official report to Governor Shoup, said:

"Any waters necessary to supply lands in the Republic of Mexico (hereafter to be determined by international treaty) shall be supplied from the surplus flow of the river. If the surplus is not sufficient, any deficiency shall be borne equally by the upper basin and the lower basin."

I am certain that Mr. Carpenter would have added had he thought such a doubt were to be raised:

"Water held in the upper basin to generate power and which for physical reasons could not be used by the upper basin for agricultural or domestic purposes is surplus water to the upper basin."

Such an interpretation must be crystal clear to any student of the seven-State compact and the official interpretations of its provisions.

The upper and lower basins were each apportioned from the Colorado River system the exclusive beneficial consumptive use of 7,500,000 acre-feet of water per annum, and in addition the lower basin was given the permission to increase its beneficial consumptive use of an extra million acre-feet per annum of surplus water.

However, the 7,500,000 acre-feet awarded to the lower States had a very clear priority over the 7,500,000 acre-feet awarded to the upper States.

In reality, the compact gave the lower States 7,500,000 acre-feet of water per annum and the upper States that much water if there should be any water left in the river, provided the upper States used that water only for domestic or agricultural purposes.

"ARTICLE III

"a( ) There is hereby apportioned from the Colorado River system in perpetuity to the upper basin and to the lower basin, respectively, the exclusive beneficial consumptive use of 7,500,000 acre-feet of water per annum, which shall include all water necessary for the supply of any rights which may now exist.

"(b) In addition to the apportionment in paragraph (a) the lower basin is hereby given the right to increase its beneficial consumptive use of such waters by 1 million acre-feet per annum."

But here is the catch in this award:

"(d) The State of the upper division will not cause the flow of the river at Lee Ferry to be depleted below an aggregate of 75 million acre-feet for any period of 10 consecutive years reckoned in continuing progressive series beginning with the first day of October next succeeding the ratification of this compact."

The following quotes from the questions by Senator Hayden and answered on January 27, 1923, by the Chairman of the Commission, Herbert Hoover, leave nothing to the imagination with respect to the extra 1 million acre-feet of surplus waters over and above the 7,500,000 acre-feet allocated annually to each of the two basins, and it does not take priority over the upper States award of 7,500,00 feet provided they use all of their 7,500,000 for agricultural and domestic purposes.

If the upper basin stores water for power purposes at least a million acre-feet per annum must go to satisfy this demand.

"Question 6. Are the 1 million additional acre-feet of water apportioned to the lower basin in paragraph (b) of article III supposed to be obtained from the Colorado River or solely from the tributaries of that stream within the State of Arizona?

"Answer. The use of the words 'such waters' in this paragraph clearly refers to waters from the Colorado River system, and the extra 1 million acre-feet provided for can therefore be taken from the main river or from any of its tributaries.

"Question 22. Does the Colorado River compact apportion any water to the State of Arizona?

"Answer. No, nor to any other State individually."

The apportionment is to the groups.

It should be noted, and I repeat, that Secretary Hoover's official interpretations were made before the compact was ratified by any State; furthermore, it was not disputed by any of them when they did ratify it.

On December 15, 1922, Colorado Commissioner Delph E. Carpenter in his official report to the Governor of Colorado, the Honorable Oliver H. Shoup, submitted several tables explaining the allocation of the water of the Colorado River system. Table 4 reads as follows:

TABLE 4

	Acre-feet
Upper division allocation includes present consumption	7,500,000
Lower division allocation includes present consumption	7,500,000
Lower division permissible increase in water consumption	1,000,000
Total allocated or permitted	16,000,000
Unallocated surplus (estimated)	4,500,000
Estimated average annual water supply	20,500,000

Mr. Carpenter also said in this report:

"At any time after 40 years, if the development in the upper basin has reached 7,500,000 acre-feet annual beneficial consumptive use or that of the lower basin has reached 8,500,000 acre-feet, any two States may call for a further apportionment of any surplus waters of the river. * * *

On March 20, 1923, Colorado Commissioner Delph E. Carpenter in a joint letter to Colorado Senator M. E. Basho and Colorado Representative Royal W. Calkins said, among other things:

"Paragraph (b) article III permits the lower basin to increase its annual beneficial consumptive use of water 1 million acre-feet. The two paragraphs permit an aggregate annual beneficial consumptive use of 8,500,000 acre-feet, and no more. The words 'per annum,' as used in paragraph (b) are not synonymous with the word 'annually.' No cumulative increase is intended by that paragraph."

On February 10, 1923, Colorado Commissioner Delph E. Carpenter addressed a telegram to the Honorable Herbert Hoover, Chairman, Colorado River Commission and received a prompt reply.

On February 13, he addressed a telegram to the Honorable R. T. McKisick, deputy attorney general, Sacramento, Calif., and that same day received a reply.

These exchanges of telegrams are pertinent to an understanding of this phase of the compact and are inserted here.

[Telegram]

CAPITAL BUILDING,
Denver, Colo., February 10, 1923.

HON. HERBERT HOOVER,
Chairman, Colorado River Commission,
Washington, D. C.:

Do you concur with me that the intent of the Commission in framing the Colorado River compact was as follows:

That paragraph (b) of article III means that the lower basin may increase its annual beneficial consumptive use of water 1 million acre-feet and no more?

DELPH E. CARPENTER.

WASHINGTON, D. C., *February 12, 1923.*

DELPH E. CARPENTER,
State Capitol, Denver, Colo.:

I concur with you, and shall so advise Congress in my report, that the intent of the commission in framing the Colorado River compact was as follows:

Paragraph (b) of article III means that lower basin may acquire water rights under the compact to annual beneficial consumptive use of water in excess of the apportionment in paragraph (a) of that article by 1 million acre-feet and no more. There is nothing in the compact to prevent the States of either basin using more water than the amount apportioned under paragraphs (a) and (b) of article III, but such use would be subject to the further apportionment provided for in paragraph (f) of article III and would vest no rights under the present compact.

HERBERT HOOVER.

DENVER, COLO., *February 13, 1923.*

R. T. MCKISICK,
Deputy Attorney General,
Sacramento, Calif.:

Do you concur with me that intent of Commission in framing Colorado River compact was as follows:

That paragraph (b) of article III means that the lower basin may increase its annual beneficial consumptive use of water 1 million acre-feet and no more?

DELPH E. CARPENTER.

SACRAMENTO, CALIF., *February 13, 1923.*

HON. DELPH E. CARPENTER,
State Capitol, Denver, Colo.:

Am of opinion that paragraph (b) of article III permits increase of annual beneficial consumptive use of water by lower basin to 8,500,000 acre-feet total or 1 million in excess quantity apportioned each basin in perpetuity by paragraph (a), article III, and no more. When both paragraphs are read together no other construction tenable. "Per annum" not synonymous with "annually."

R. T. MCKISICK.

SACRAMENTO, CALIF., *February 15, 1923.*

DELPH E. CARPENTER,
Denver, Colo.:

My interpretation of article III and VIII well expressed in McKisick's wire of the 13th.

W. F. MCCLURE,
Seven State Compact Commissioner for California.

Utah Commissioner R. E. Caldwell, in his report to the Utah Senate, among other things, said:

"The lower basin States, for the most part, when they divert their water, wholly consume it and they get no credit for use of return flow for it does not exist, and they are, therefore, limited to the diversion of 8,500,000 acre-feet and are held strictly to the requirement of 'consumptive beneficial use' of such as they do divert."

In the report to the Governor of California by Hon. W. F. McClure, commissioner for California, made January 8, 1923, appears this statement:

"In conclusion, permit me to add that the terms of the compact do full justice to the States in interest, and the equitable division and apportionment of the use of the waters of the Colorado River system whereby the lower basin is allocated 7,500,000 acre-feet per annum, with an allowable increase of 1 million acre-feet per annum by reason of the probably rapid development upon the lower river, and fully guarantees to California an ample water supply to adequately care for the enormous future growth of the Imperial Valley and adjacent territory."

The Honorable Herbert Hoover, who, as I have said, was the chairman of the commission that drafted and approved by its unanimous vote the seven-State compact, said:

"The lower basin will, therefore, receive the entire flow of the river, less only the amount consumptively used in the upper States for agricultural purposes."

The Honorable A. P. Davis, Director of of the Reclamation Bureau, on January 30, 1923, announced that:

"The Colorado River compact provides that the lower basin shall be guaranteed an average of 7,500,000 acre-feet of water annually from the upper basin and all of the yield of the lower basin, and that any water not beneficially used for agricultural and domestic uses (in the upper basin) shall likewise be allowed to run down for use below."

These data prove conclusively that the extra 1 million acre-feet of water per annum allocated to the lower basin is to be acquired from the surplus and otherwise unallocated water of the Colorado River system.

The same is true of the 1,500,000 allocated annually by treaty to the United States of Mexico.

I am compelled to keep emphasizing that whatever water is stored in the Glen Canyon and Echo Park Reservoirs will be surplus to the agricultural and domestic needs of the upper basin, and must be delivered to the lower basin to satisfy the award of 1,500,000 acre-feet to Mexico and 1 million acre-feet to the lower basin.

Furthermore, should the lower basin require an additional supply of water for agricultural and domestic purposes, the water stored in these reservoirs must be released.

Under the 7-State compact the upper States must deliver at Lee Ferry in each 10-year period 75 million acre-feet to the lower States and 7½ million acre-feet to Mexico before they can use 1 drop of water themselves beyond what they used before the 7-State compact was ratified.

In the current 10-year period that will leave only 3,250,000 acre-feet per year for their total use. In the previous 10-year period they would have had 4,150,000 acre-feet a year. In 1902 the upper basin States under this formula would have had no water at all.

The Reclamation Bureau estimates that the proposed storage reservoirs in the upper Colorado Basin will cost the upper basin 880,000 acre-feet annually in evaporation. It will be charged to the upper basin as consumptive use. Colorado's portion of that loss would be 400,000 acre-feet.

Water still does not run uphill, and storage down the river from Colorado to generate electric energy, frowned upon by the seven-States compact, cannot secure for us one drop of water, but, to the contrary, will cost us 400,000 acre-feet annually in evaporation, which under the upper Colorado Basin compact will be charged to Colorado as consumptive use.

Colorado is close to the bottom of the barrel insofar as Colorado River water is concerned. Colorado has a record of lavish generosity to all of her neighbor States. Now, at this late date it will be State suicide unless she looks after her own interests with courage and wisdom. She positively cannot afford the loss of 400,000 additional acre-feet. She cannot afford to agree to a storage plan whose certain effect will be to create additional surplus water out of the upper basin's meager supply, which under the seven-State compact must go to the lower basin.

Colorado must insist that the 42 reservoirs surveyed in the high country of Colorado be authorized simultaneously with the authorization of the storage plan and which will give Colorado an absolute right to the water which is developed.

The Hill report prepared pursuant to a contract with the Colorado Legislature indicates there is something over a million acre-feet of unappropriated water in the Colorado River system in Colorado. However, the Hill report did not charge Colorado with the burden of Colorado's portion of the priority commitment to Mexico, which under the seven-State compact cannot be less than 375,000 acre-feet.

And another thing, if Glen Canyon and the Echo Park Reservoirs are built, Colorado's portion of the Mexican burden becomes not less than 750,000 acre-feet annually.

Had Mr. Hill recognized these binding and irrevocable priorities and the evaporation of the downriver storage plans, which is to be charged to Colorado as "consumptive use" of 400,000 acre-feet, he could not have shown any unappropriated water whatsoever in Colorado for Colorado.

Colorado has entered into irrevocable compacts with all of the States to the east, west, north, and south. In each of these compacts Colorado has been generous to a fault. Now most of her water is lost forever; and yet her neighbors are asking her to surrender more and more of this most previous resource.

The time has come when Colorado's dwindling supply must be guarded jealously and protected fully. That is a responsibility which I, as Governor of Colorado, must assume.

Who will say that the Glen Canyon Dam in the State of Arizona and the Echo Park Dam on the Colorado-Utah border are not extraordinary dams from an engineering point of view. Glen Canyon is the sort of project that makes an engineer's mouth water, and the Reclamation Bureau is a Bureau of engineers. Who will say that these projects will not be of incalculable value to the lower basin.

Glen Canyon, which will collect 100,000 acre-feet of silt a year, will extend the life of the Hoover project 500 years, but what I want someone to tell me is, Why should they be built with upper Colorado Basin funds at the water expense of the State of Colorado?

There is only one route remaining for us to take. We must put our water to beneficial use in our own State if we are to gain any right to it. That is the plain language of the seven-State compact. It states that condition without equivocation.

The Reclamation Bureau has explored 42 reservoir sites high up on the Colorado River system in Colorado. We cannot, we dare not, settle for less than their authorization now.

Congressional authorization does not mean immediate construction, but it will give to these proposed reservoir sites an official priority.

Colorado contributes 72 percent of the water of the upper Colorado River Basin. Is it asking too much that we be allowed to use less than one-fourth of what we produce? If that is wrong, then I am wrong.

Senator WATKINS. I have just one observance at this point. Having sat through the hearings in the Senate last year, I am sure the answer was given there by the Bureau of Reclamation and by numerous witnesses. I think Governor Johnson is entitled to raise his question and have it put the way he wants to put it. But I hope that probably the next witness will be one who will give the answers and step by step as to what this document, known as the 1922 compact, means or at least what we are trying to do. I have always understood that the very purpose of building many of these dams was to make it possible for us

not to deplete the river less than 75 million acre-feet at Lee Ferry in a 10-year period.

I understood Mr. Larson and other members of the Reclamation Bureau to testify repeatedly that was one of the reasons, not the only one but one of the reasons why we had to build these dams, why we had to go to this enormous expense.

Senator KUCHEL. Governor, are you acquainted personally or by reputation with Raymond A. Hill, a consulting engineer?

Governor JOHNSON. I know him by reputation. He prepared a survey in Colorado. I have studied his report very, very carefully.

Senator KUCHEL. He was employed by the State government?

Governor JOHNSON. He was employed by the State of Colorado.

Senator KUCHEL. I have what purports to be a copy of his comments delivered before the Sacramento, Calif., section of the American Society of Civil Engineers on December 7, 1954, which before your hearing closes I would like unanimous consent to offer for inclusion in the record.

Senator ANDERSON. Without objection, it will be made a part of the record at this point.

(The information referred to above follows:)

COLORADO RIVER DEFICITS

(A paper to be presented at a meeting of the Sacramento section, American Society of Civil Engineers, in Sacramento, Calif., on December 7, 1954, by Raymond A. Hill, M. ASCE, consulting engineer)

When the Santa Fe compact was entered into in 1922 by the States of Wyoming, Colorado, Utah, New Mexico, Nevada, and California, and later by Arizona, it was believed that the flow of Colorado River would be in excess of all probable uses. Some still so believe; others have awakened to the fact that nature was not bound by that compact.

No attempt was then made to allocate the presumed supply among the several States; instead, a point of division, known as Lee Ferry, near the northern boundary of Arizona, was selected. In the words of the compact:

"The term 'upper basin' means those parts of the States of Arizona, Colorado, New Mexica, Utah, and Wyoming within and from which waters naturally drain into the Colorado River system above Lee Ferry, and also all parts of said States located without the drainage area of the Colorado River system which are now or shall hereafter be beneficially served by waters diverted from the system above Lee Ferry.

"The term 'lower basin' means those parts of the States of Arizona, California, Nevada, New Mexico, and Utah within and from which waters naturally drain into the Colorado River system below Lee Ferry, and also all parts of said States located without the drainage area of the Colorado River system which are now or shall hereafter be beneficially served by waters diverted from the system below Lee Ferry."

The upper basin was then apportioned 7.5 million acre-feet per year to cover its consumptive uses of water; the lower basin was apportioned another 7.5 million acre-feet per year plus 1 million acre-feet per year. Mexico was to be supplied out of the surplus flow of Colorado River. The quantity to be delivered to Mexico has since been defined by treaty as a minimum of 1.5 million acre-feet per year. The total apportionment is thus 7.5 million to the upper basin, 8.5 million to the lower basin, and 1.5 million to Mexico, making 17.5 million acre-feet per year.

Arizona claims that the 1 million acre-foot allocation to the lower basin was included to cover all uses of Gila River water in Arizona; California does not agree with this interpretation of the compact, and claims that Arizona should be charged with about double that amount. If we deduct 1 million acre-feet per year from the total apportionment, as claimed by Arizona, the average flow of Colorado River, exclusive of Gila River, would have to be 16.5 million acre-feet per year to meet the anticipated demands. If we deduct 2 million, as claimed by California, then the balance to be supplied by Colorado River is 15.5 million

acre-feet per year. Actually, it makes little difference which value is accepted, except to legalistic minds, because all of the flow of Gila River is now and has for many years been used in central Arizona (except for rare floods which cannot be used by anyone) and because the flow of Colorado River has not been great enough during the past 40 years to have satisfied consumptive demands of even 15.5 million acre-feet per year.

Last year I made an investigation for the State of Colorado to determine the probable future depletion in that State of its share of Colorado River water. This share was fixed by a compact entered into by the upper basin States in 1948. I then found and reported that Colorado could not count on its share of the 7.5 million acre-feet apportioned to the upper basin; not because there would be no need for all of it, but because the practical limit of development would be about 6.2 million acre-feet per year. This conclusion was challenged, of course, by the promoters of more and bigger projects.

Let us look at the records of the historical flow of Colorado River for the answer to this challenge. During the past 10 years the flow at Lee Ferry, the point of division in northern Arizona between the upper basin and the lower basin, averaged only 11.57 million acre-feet per year; during the past 20 years the average was 11.95 million acre-feet per year; during the past 30 years it was 12.14 million acre-feet per year; and for the 40 years from October 1, 1914, to September 30, 1954, the average was 13.15 million acre-feet per year. The values for other periods are given in the tabulation, plate A.

Comprehensive studies have been made by the United States Bureau of Reclamation and other Federal agencies and by the upper Colorado compact commission to determine the consumptive uses of water in the drainage basin above Lee Ferry. It was found from these surveys, and accepted as a basis for negotiation of the upper Colorado River compact, that the virgin flow of Colorado River at Lee Ferry for the period from 1914 to 1945 had been depleted 1.85 million acre-feet per year on the average. The historical flow of Colorado River at Lee Ferry for that period was 13.79 million acre-feet per year, so that the natural undepleted flow was found to be 15.64 million acre-feet per year. There has since been some increase in consumptive uses in the upper basin but the total is not now much more than 2 million acre-feet per year. Hence, for practical purposes, it may be assumed that the natural undepleted flow in past years averaged 2 million acre-feet per year more than the quantities of water than actually passed Lee Ferry.

The only directly measurable, and perhaps the only enforceable, provision in the Santa Fe compact is article III (d), which is:

"The States of the upper division will not cause the flow of the river at Lee Ferry to be depleted below an aggregate of 75 million acre-feet for any period of 10 consecutive years reckoned in continuing progressive series beginning with the 1st day of October next succeeding the ratification of this compact."

Hence, an average of 7.5 million acre-feet per year must be deducted from the historical flow at Lee Ferry to determine the quantity of water that was actually available to the upper basin to supply consumptive uses in excess of those made during the period of record. These quantities are also shown on plate A. From this it will be seen that the supply available for all new consumptive uses in the upper basin was as follows:

During the past 10 years, 4.07 million acre-feet per year
During the past 20 years, 4.45 million acre-feet per year
During the past 30 years, 4.64 million acre-feet per year
During the past 40 years, 5.65 million acre-feet per year.

Consumptive uses in the upper basin being now close to 2 million acre-feet per year, there could be about 5.5 million acre-feet per year expansion in the upper basin within the apportionment under the Santa Fe compact. In order to satisfy this increase in consumptive use without reducing the flow at Lee Ferry below 75 million acre-feet in any 10 consecutive years, the average historical flow would have to be at least 13 million acre-feet per year. The historical flow at Lee Ferry did not average as much as 13 million acre-feet per year from October 1, 1917, to September 30, 1954. Expressed in another way, if we count back from the present, 38 years is the shortest period of time during which the historical flow was as great as 5.5 million acre-feet per year in excess of the minimum required delivery at Lee Ferry of 75 million acre-feet in each 10 consecutive years.

This means that, even if the Federal Government had built the upper Colorado River storage project and had begun to operate it as soon as the Santa Fe compact was entered into, and in conformity with it, there would not

have been enough water since then for the beneficial consumptive uses in the upper basin permitted by that compact. Yet, this is the project which was recommended to the last Congress of the United States and which came close to being authorized.

In my opinion, the proponents of the upper Colorado River storage project are being overly optimistic when they assume that consumptive uses in the upper basin totaling 7.5 million acre-feet per year could be satisfied by providing enough reservoirs for complete regulation of the flow of Colorado River. Overoptimism is not restricted, however, to the upper basin. Plans for the development of the lower basin are still being made without regard to foreseeable limits on the supply of water available from Colorado River.

Irrespective of whether the upper basin is limited physically to something less than the 7.5 million acre-feet of water per year apportioned to that basin, the lower basin cannot count on more than 75 million acre-feet in each 10 consecutive years at Lee Ferry. This is because it will take complete regulation for periods of at least 30 years to provide even the 6.2 million acre-feet per year which I believe is the practical limit of development in the upper basin.

During the last 10 years, the net depletion of the flow of Colorado River between Lee Ferry and Parker Dam, exclusive of diversions by the metropolitan water district to southern California, was more than 5 million acre-feet. The magnitude of such depletions by years is shown on plate B. Such depletions will never be lessened; they may be increased by evaporation from new reservoirs and by greater use of water in northern Arizona, in southern Utah, and in Nevada. The most optimistic assumption possible under the circumstances is that the supply divertible from Lake Havasu will be as much as 7.0 million acre-feet per year on the average after upper Colorado River storage project, or any substantial portion of it, goes into operation.

A minimum of 1.5 million acre-feet per year of usable water must be delivered to Mexico at the international boundary under the treaty entered into a few years ago. It is recognized that some deliveries greater than those scheduled will be unavoidable because of variations in diversions to the Parker Valley, the Palo Verde Valley, the Yuma project, the Welton Mohawk project, and through All-American Canal to Imperial Valley and Coachella Valley. Such overdeliveries have been variously estimated from 100,000 acre-feet per year to several times that amount. It is to be expected that deliveries at the international boundary in the order of 1.7 million acre-feet per year will have to be made in order to fulfill the treaty obligation.

If from the 7.0 million acre-feet of water available at Lake Havasu with upper Colorado River storage project in operation there be deducted the minimum delivery to Mexico, the net for all beneficial uses in Arizona and California would be 5.5 million acre-feet per year. Wastes and overdeliveries to Mexico and increased uses between Lee Ferry and Lake Havasu could bring this amount down to 5.0 million acre-feet per year.

Depletions of the flow of Colorado River between Lake Havasu and the international boundary, including diversions by the Metropolitan Water District of Southern California, have increased during the past 15 years from about 3.5 to about 5.5 million acre-feet per year, as shown on plate C. Progressively greater diversions by the metropolitan water district and others through existing works will surely increase such depletions to as much as 6.0 million acre-feet per year before large storage works could be constructed in the upper basin.

Hence, it seems obvious that:

Whenever Colorado River above Lee Ferry is regulated, which it must be before there can be much increased use in the upper basin States of their share of the total supply, there will not be enough water left in Colorado River after treaty deliveries to Mexico to supply existing uses in the lower basin; there will certainly be no surplus for new or expanded uses.

In closing, I can only emphasize that the records of the flow of Colorado River show that the future of southern California is dependent upon some practical solution of this physical problem. The Supreme Court of the United States can determine the rights of California to the waters of the Colorado River, but it cannot create a supply of water for diversions under those rights.

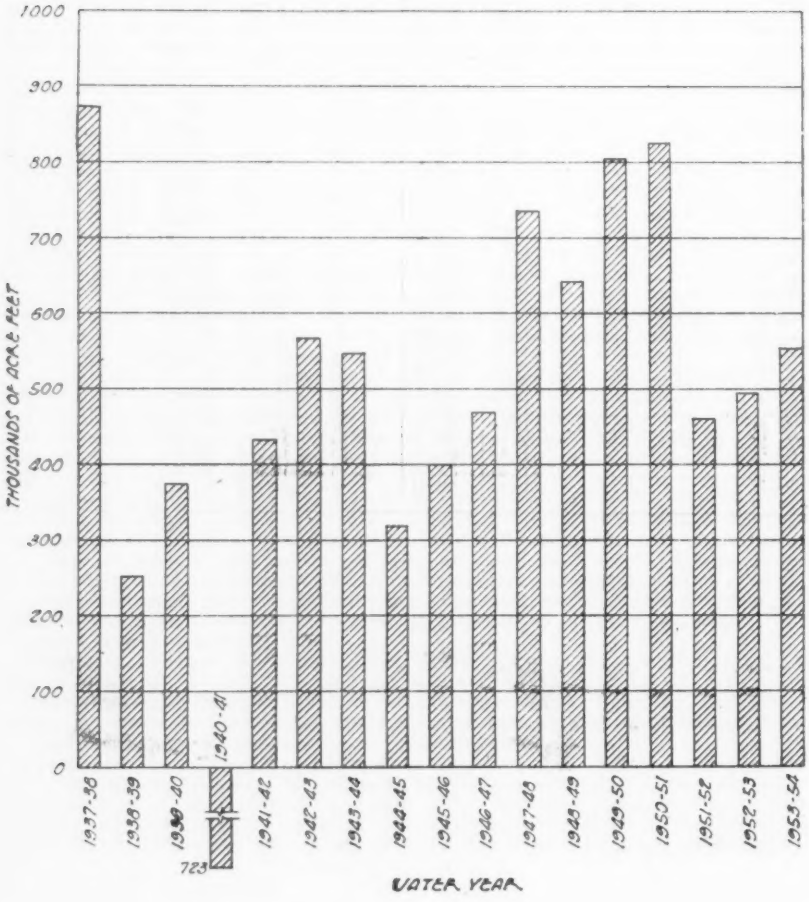
Colorado River at Lee Ferry, historical flow

[Quantities in millions of acre-feet]

Water year	Flow in year	Accumulative total	Average historical		Accumulative total minus 7.50 per year	Average of supply in excess of 7.50 per year	
			Number of years	Quantity		Number of years	Quantity
1953–54	6.15	6.15	1	6.15	−1.35	1	
1952–53	8.82	14.97	2	7.49	−0.03	2	
1951–52	17.97	32.94	3	10.98	10.44	3	3.48
1950–51	9.82	42.76	4	10.69	12.76	4	3.19
1949–50	11.05	53.81	5	10.76	16.81	5	3.26
1948–49	14.36	68.17	6	11.36	23.17	6	3.86
1947–48	13.69	81.86	7	11.69	29.36	7	4.19
1946–47	13.51	95.37	8	11.92	35.37	8	4.42
1945–46	8.75	104.12	9	11.57	36.62	9	4.07
1944–45	11.55	115.67	10	11.57	40.67	10	4.07
1943–44	13.22	128.89	11	11.72	46.39	11	4.22
1942–43	11.26	140.15	12	11.70	50.15	12	4.20
1941–42	17.03	157.18	13	12.09	59.68	13	4.59
1940–41	16.05	173.23	14	12.37	68.23	14	4.87
1939–40	7.08	180.31	15	12.02	67.81	15	4.52
1938–39	9.39	189.70	16	11.86	67.70	16	4.36
1937–38	15.44	205.14	17	12.07	77.64	17	4.57
1936–37	11.90	217.04	18	12.06	82.04	18	4.56
1935–36	11.97	229.01	19	12.05	86.51	19	4.55
1934–35	9.91	238.92	20	11.95	88.92	20	4.45
1933–34	4.40	243.32	21	11.59	85.82	21	4.09
1932–33	9.75	253.07	22	11.50	88.07	22	4.00
1931–32	15.29	268.36	23	11.67	95.86	23	4.17
1930–31	6.39	274.75	24	11.45	94.75	24	3.95
1929–30	13.07	287.82	25	11.51	100.32	25	4.01
1928–29	19.22	307.04	26	11.81	112.04	26	4.31
1927–28	15.32	322.36	27	11.94	119.86	27	4.44
1926–27	16.59	338.95	28	12.11	128.95	28	4.61
1925–26	14.01	352.96	29	12.17	135.46	29	4.67
1924–25	11.34	364.30	30	12.14	139.30	30	4.64
1923–24	12.48	376.78	31	12.15	144.28	31	4.65
1922–23	16.26	393.04	32	12.28	153.04	32	4.78
1921–22	16.30	409.34	33	12.40	161.84	33	4.90
1920–21	20.71	430.05	34	12.65	175.05	34	5.15
1919–20	19.74	449.79	35	12.85	187.29	35	5.35
1918–19	10.86	460.65	36	12.80	190.65	36	5.30
1917–18	13.65	474.30	37	12.82	196.80	37	5.32
1916–17	21.89	496.19	38	13.06	211.19	38	5.56
1915–16	17.32	513.51	39	13.17	221.01	39	5.67
1914–15	12.50	526.01	40	13.15	226.01	40	5.65
1913–14	19.33	545.34	41	13.30	237.84	41	5.80

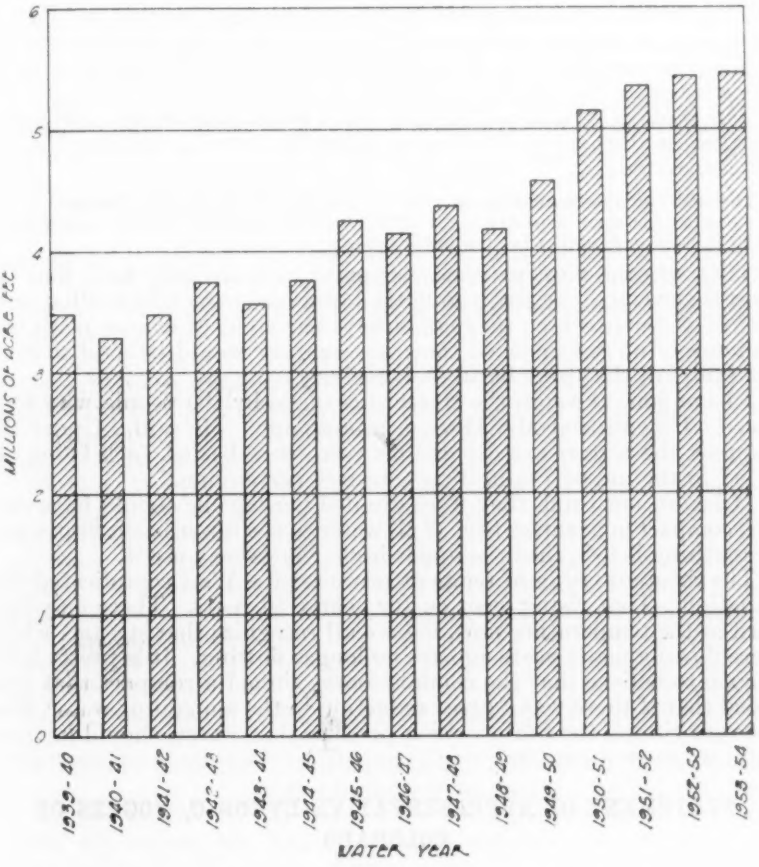
(B)

DEPLETION IN FLOW OF COLORADO RIVER
BETWEEN
LEE FERRY AND PARKER DAM
EXCLUDING
COLORADO RIVER AQUEDUCT DIVERSION



(C)

DEPLETION IN FLOW OF COLORADO RIVER
BETWEEN
PARKER DAM AND INTERNATIONAL BOUNDARY
INCLUDING
COLORADO RIVER AQUEDUCT DIVERSION



Senator ANDERSON. Governor Johnson, if it is possible to go back and review all the newspaper stories written at the time this compact was negotiated it certainly would indicate what the people were thinking, at the time at least. Delph Carpenter was the bellwether for all the people who were there from the upper basin States. His representation was, I think safe to say, greater than any of the others and probably greater than all of the others in the upper basin States.

You said that he wisely protected the water rights existing at the time of the compact. I am convinced that he thought he was as well protecting the rights of Colorado to water out of the stream in future years. I think if you will go back and look at the contemporaneous statements made by the individuals who were there you would see that there was a complete understanding in everyone's mind at least that they were assuming a stream that had 20 million acre-feet of water per year and the only reason they put this in was that they hoped that the upper basin States would build storage dams so they would not reap some luxurious living for a few years and then have famine for other years and that the storage dams would permit them to so store the water that they could let it down in some regular flow.

The State of Arizona, of course, was, I might almost say, a reluctant partner in all these proceedings and yet Mr. Sloan's statement is significant to me:

> The effect of the compact is merely to place in the two basins the use, within the limitations upon a parity right of 7½ million acre-feet for the upper basin and 8½ million acre-feet for the lower basin.

That was the most extreme viewpoint that anybody took that the most they were doing was giving the lower basin an extra million acre-feet of water to which they could have the right of consumptive use. But surely no one believed that this compact would be used to deny the States of the upper basin their rights.

I have gone through the statements made by the people who were there. I mentioned Mr. Davis a minute ago. He said, "Under the compact the wafers are divided between the 2 basins, each being entitled to the use of 7½ million acre-feet per annum."

If he did not think they were divided perhaps he should have said this compact guarantees first of all water to the lower basin States and if anything is left, then the upper basin States may use it.

The constant rising of temperatures over the West complicated this situation. That rising went on for nearly 30 years. There may be a turn in the temperature now, but we all recognize that streams which were flowing many years ago are no longer flowing. It is pretty hard for me to believe that the commissioners signed a compact that provided that if there was a great reduction in the amount of water, that the roof States, the States which produce that water, should have no right whatever to use it.

STATEMENT OF REPRESENTATIVE BYRON G. ROGERS OF COLORADO

Representative ROGERS of Colorado. I wondered if you would let me interrupt for an observation in support of the statement you made that the State of California recognized that when they came to this Congress and asked that the Boulder Canyon Project Act be amended, which was done in 1939 and 1940, I was attorney general of the State

of Colorado at that time. The representations were made that from this amendment certain funds would be made available for investigation purposes in the upper basin States and that when it was amended these funds were made available.

The studies have been made by the Bureau of Reclamation, and it was the intention of all the parties, at least as late as 1940, for a complete development of the upper Colorado River Basin, and that was supported by the State of California and its representations were made to all of the members of the compacting States, which includes the 4 upper basin States and the 3 lower basin ones.

Senator ANDERSON. We thank you for that statement because that is a very valuable one to us. But when the statements were being made the State of Utah's comments got into the report. The representative of Utah was outlining how this would work out. He said:

> The river may be wholly diverted by the upper States and more than enough to supply the quantity required to pass Lee's Ferry will still be assured.

In other words, you could take the whole flow of the stream in Colorado and Wyoming and Utah and New Mexico and still there would be enough passing Lee's Ferry to satisfy the lower States. That is the circumstance under which these States ratified it.

Senator WATKINS. That is by storage. You could not do it any other way.

Senator ANDERSON. That is the basis on which these States ratified it.

Senator WATKINS. At times you could take the entire flow of the river if you had storage water that would make up what you have been taking out. That is what I have been emphasizing by this exchange arrangement.

Governor JOHNSON. There cannot be any question on the part of anyone that the commissioners who negotiated this compact believed that there was a great deal more water in the river than there has been in the last 26 years. They overestimated the flow of the river. If they made any mistakes it is due to making that erroneous estimate.

Senator ANDERSON. Do you have additional testimony, Governor?

Governor JOHNSON. No; I am all through.

Senator ANDERSON. Are there other questions?

Governor JOHNSON. I take this opportunity to thank the chairman of this committee and the members of this committee for the very courteous treatment that they have given to me and for the help they have extended to me.

Senator ANDERSON. Governor, we hope we have many occasions to bring you back here.

Would you state your name for the record, Mr. Crawford?

STATEMENT OF IVAN C. CRAWFORD, DIRECTOR, COLORADO WATER CONSERVATION BOARD

Mr. CRAWFORD. Mr. Chairman, gentlemen of the committee, my name is Ivan C. Crawford. I am the director of the Colorado Water Conservation Board, which is the official agency of the State of Colorado charged with the duty of promoting the conservation of the waters of the State of Colorado in order to secure the greatest utilization of such waters and the utmost prevention of floods.

59762—55——18

At the hearings of this committee on S. 1555, June 28, July 3, 1954, I read into the record a resolution of the Colorado Water Conservation Board adopted on January 14, 1954, setting forth the position of the board relative to the Colorado River storage project and participating projects. This resolution will be found on pages 279, 280, and 281 in the record of those hearings.

Since that date the position of the board has changed only in the following particulars:

On February 4 of this year the board approved:

1. The inclusion as Colorado participating projects the 18 projects suggested by Governor Johnson;
2. The substitution of Juniper project for Cross Mountain; and
3. The revised Curecanti as an initial project.

The 18 projects or units referred to are: Fruitgrowers extension dam, Tomichi Creek, East River, Ohio Creek, Fruitland Mesa, Bostwich Park, Grand Mesa, Dallas Creek, Parshall, Troublesome, Rabbit Ear, Eagle Divide, Woody Creek, West Divide, Bluestone, Battlement Mesa, Dolores, and Savery-Pot Hook projects.

Mr. Chairman, I would like to offer a certified copy of the action of the Colorado Water Conservation Board referred to above.

(The resolution referred to is as follows:)

EXTRACTS FROM THE MINUTES OF THE COLORADO WATER CONSERVATION BOARD MEETING OF FEBRUARY 4, 1955

"Mr. PUGHE. I move that we include the 18 projects listed in the suggestions by the Governor, including Battlement Mesa.

"(The motion was seconded by Mr. Dille, and upon vote being taken, the motion carried unanimously.)

"Mr. PUGHE. I move that the Juniper unit be substituted for Cross Mountain in the present bill.

"(The motion was seconded by Mr. Kelly, and upon vote being taken, the motion carried unanimously.)

"Mr. MOSES. I move that we approve the Curecanti unit as revised as an initial project.

"(The motion was seconded by Mr. Dille, and upon vote being taken, the motion carried unanimously.)"

I certify that the above is a true copy of extracts from the minutes of the Colorado Water Conservation Board meeting February 4, 1955.

(Signed) IVAN C. CRAWFORD,
Director.

The 18 projects referred to are: Fruitgrowers Extension, Tomichi Creek, East River, Ohio Creek, Fruitland Mesa, Bostwich Park, Grand Mesa, Dallas Creek, Parshall, Troublesome, Rabbit Ear, Eagle Divide, Woody Creek, West Divide, Bluestone Unit, Battlement Mesa, Dolores, Savery-Pot Hook.

(Signed) IVAN C. CRAWFORD,
Director.

Senator ANDERSON. Thank you.

We understand then that these projects have been endorsed.

Mr. CRAWFORD. There has been no change in the resolutions which were presented to this committee a year ago in January.

Senator ANDERSON. Thank you very much.

Senator MILLIKIN. What was the vote on the February resolution?

Mr. CRAWFORD. It was unanimous.

Senator ANDERSON. I appreciate Senator Millikin's getting that information for us. Thank you a whole lot.

Mr. Mitchem, will you come forward?

Will you state your name for the record?

STATEMENT OF ALLEN P. MITCHEM, REPRESENTING THE BOARD OF WATER COMMISSIONERS OF DENVER, COLO.

Mr. MITCHEM. My name is Allen Mitchem. I am an attorney engaged in private practice in Denver, and I appear here as a representative of the board of water commissioners of the city and county of Denver at the request of the manager of the water board.

Some 12 or more persons from the Denver metropolitan area appeared before this committee last year in support of S. 1555 and particularly in support of a section in that bill which would enable Denver to utilize its rights to water from the Blue River, a tributary of the Colorado River.

Among those who appeared were the mayor of Denver, officials of the Denver Water Board, representatives of both the junior and senior chambers of commerce, private citizens, and representatives of nearby towns, cities, and communities.

Mayor Newton gave the official position of the city and county of Denver on page 312 of the report of the committee hearings when he stated that he and the other members of the delegation were here in support of S. 1555 with amendments then being proposed.

The record made in last year's hearings shows that the city and county of Denver is the greatest single economic unit served by the upper Colorado River—that as a regional distribution and manufacturing center, Denver is the hub of a rapidly expanding regional economy that is dependent upon Denver just as Denver is dependent upon the region.

The Denver water system today, as a year ago, serves a rapidly growing metropolitan area comprising over 37 percent of the population of the State of Colorado.

A point emphatically made by the testimony last year, and which bears repeating this year, is that with the present rate of growth of the Denver metropolitan area, the city will exhaust its present water resources by 1962.

Seven years of construction work are necessary to bring in additional water, and that work can't be started without adoption of the part of this bill that affects Denver, or some equivalent.

The only additional source of water within reach of the city is the Blue River, a tributary of the Colorado, which river's water will have to be brought to Denver through a 23-mile tunnel which will require a minimum of 7 years to complete.

A continuation of drought conditions has made Denver's need for additional water even more critical, and has tended to increase Denver's feeling of urgency for passage of S. 500 as introduced and containing section 11, the section specifically relating to Denver's Blue River project.

As explained in the testimony of Glenn Saunders, attorney for the Denver Water Board, on pages 328–329 of last year's report, there was at the time of those hearings a case pending in the Colorado Supreme Court involving an adjudication of the waters of the Blue River.

In that action Denver had sought a 1921 priority date for 1,600 second-feet of Blue River water.

Last October, the Colorado Supreme Court announced its decision, sustaining the trial court's action in awarding Denver a 1946 priority for 788 second-feet, together with a storage priority for 252,000 acre-feet for a proposed reservoir at Dillon, Colo.

These priorities awarded would afford Denver the full amount of water which would have been available under Denver's original plan, but for the presence of the Government's Green Mountain hydroelectric plant whose priority is currently being considered by two courts, but will, of a certainty, have a priority date senior to that of Denver.

Section 11 of S. 500 has nothing to do with uses of the Green Mountain reservoir for replacement storage for the Government's Colorado-Big Thompson project, or with compensatory storage for western Colorado appropriators. It has to do solely with use of the Government's hydroelectric installation.

Denver contends that under the provisions of the Colorado River compact (art. IV, subdivision (b)) and the Boulder Canyon Project Act (sec. 13) a power use is subservient to Denver municipal uses.

However, the legal machinery for evidencing any superiority of right in Denver has not yet been sufficiently tested to enable attorneys to know with any degree of certainty how these provisions of the Colorado River compact and Boulder Canyon project can be made effective when those power rights are owned by the Federal Government.

If these power rights were privately owned, Denver could, of course, condemn them, but not so when Government owned them.

A means of eliminating this bottleneck is provided in section 11 of S. 500 by giving authorization to the appropriate agencies of the United States Government to convey to the city and county of Denver these power rights which are senior in time, but subservient in character of use.

Section 11 of S. 500 would accomplish an additional objective necessary to the construction of the Blue River project. By authorizing appropriate agreements between the United States and Denver, it would provide a clear-cut method whereby Denver could secure easements and rights-of-way for its Blue River project over federally owned lands, some of which Denver has been attempting to secure through negotiation for more than 25 years.

These, then, are the two reasons that section 11 of this bill are so necessary to the future of Denver.

In this section, Denver is asking for nothing except the right to pay the Federal Government a fair value for what it buys.

In this connection I would like to call attention to the testimony, contained in pages 315–316 of the report of last year's hearings, to the effect that the Denver water system is now serving a great majority of the Federal installations located in the Denver area, which have a total value of almost $400 million and employ over 17,000 people exclusive of military personnel.

This fact makes clear the stake of the Federal Government in the future of Denver's water supply.

Through its testimony before this committee last year, Denver felt that it had built a record which justified the authorization contained in the present section 11 in addition to a $75 million loan from the Federal Government.

Apparently to accommodate any possible objections to this type of Federal financing in a reclamation measure, this subcommittee, in its wisdom, saw fit to recommend a bill containing language eliminating the loan feature, which language is identical to the section 11 in S. 500.

The present section 11 is in accord with the reclamation policy of the State of Colorado as expressed by that State's policymaking body, the Colorado Water Conservation Board.

We of Denver feel that it is also in complete accord with the historical purpose of reclamation from a national standpoint in that it will enable unused water to be put to beneficial use where it is badly needed.

Some objections have been voiced within the State of Colorado that the Colorado River storage project as originally planned by the Bureau of Reclamation looked too far to future insofar as use in Colorado is concerned, but Denver feels that with the immediate pressing necessity for serving more than one-third of Colorado's population provided for in section 11 of S. 500, this objection is fully met.

Senator MILLIKIN. Are there any questions of the witness? If not, thank you very much.

Mr. MITCHEM. Thank you, Mr. Chairman.

Senator ANDERSON. We have some other witnesses that possibly were promised an opportunity to be heard this afternoon. I will say that it would be useful to have a statement by Mr. Bennett who is the legislative counsel of the Bureau and get that in the record now if he may do so.

STATEMENT OF ELMER BENNETT, LEGISLATIVE COUNSEL FOR THE DEPARTMENT OF THE INTERIOR

Mr. BENNETT. My name is Elmer Bennett. I am legislative counsel for the Department of the Interior.

The purpose of the statement, as I understood Senator Anderson's request, is to deal specifically with those features of the December 20 statement of Governor Johnson of Colorado which bear upon the legislation before this committee.

In the course of the discussion this afternoon, so far as the department is concerned, I wish to make it clear that there were many implications and discussions which involved differences of points of view on priorities of apportionments of water under the compact which in our judgment, are not material to this bill.

Those are now involved in litigation between Arizona and California, particularly if in its wisdom the Supreme Court should finally order the joining of the upper basin States in the litigation there. The only questions which bear upon this bill in our judgment are those which Senator Johnson puts this way:

> Either the seven-State compact specifically denies to the upper basin the right to withhold water which it cannot use for agricultural and domestic purposes or it does not deny us such a right. Either it denies to the upper basin the right to withhold water to develop power or it does not deny us that right.

At some length he organizes the material in his statement to indicate that in his own mind he still has some doubt as to whether that answer should be yes or no. On behalf of the Department I wish to

state that the answer, so far as we are concerned, is that the upper States under the compact clearly have the right to store water for the purpose of regulating the flow in order to meet its obligations to the lower basin.

Secondly, I wish also to state very clearly that our interpretation of the compact, as I will explain in full, does mean that power may be generated in the upper basin States from water which may not be used for domestic and agricultural purposes. Firstly, the very purpose of the compact is to provide a basis for the regulation of the streamflow through storage of the waters of the stream, wherever that storage may be necessary or appropriate to accomplish the apportionments made by the compact.

Article III (e) of the compact upon which Senator Johnson's statement is predicated reads as follows:

> The States of the upper division shall not withhold water and the States of the lower division shall not require the delivery of water which cannot be reasonably applied to domestic and agricultural use.

To begin with, let me say that the provisions of the compact must be read in the light of the instrument as a whole. To quote the Honorable Delph Carpenter, commissioner for the State of Colorado in the negotiating of this compact:

> First and foremost, it must be ever kept in mind that the intent of the compact is to be ascertained from a consideration of the entire instrument and that each clause must be considered in connection with other clauses.

Now, that is a statement of ordinary legal principles as I think every lawyer in the room realizes, but I did want to emphasize that as having been applied specifically by one of the principal negotiators of the contract to the provisions of the compact.

Let us turn next to article I of the compact. That article contains a statement of the purposes thereof. The statement of purpose includes the following:

> To secure the expeditious agricultural and industrial development of the Colorado River Basin, the storage of its waters, and the protection of life and property from floods.

I repeat, "the storage of its waters."

The representative of the United States in the negotiation of the compact was Herbert Hoover, who later became President of the United States. In response to questions from Congressman Hayden, of Arizona, which were contemporaneous with consideration of the compact by the States which were made parties thereto, Mr. Hoover said the following, which will be found at page A–37 of House Document 717 of the 80th Congress, otherwise known as the Hoover Dam documents.

> The future development of the Colorado River Basin is dependent wholly upon the creation of storage. The lower States have certainly reached the limit of development by the direct diversion of the flow of the river.

Now, let us examine the reasons for Mr. Hoover's statement at that time.

Senator KUCHEL. What was the date of that document, Mr. Bennett?

Mr. BENNETT. It was January 30, 1923.

Senator ANDERSON. It is in the Congressional Record at that point. His letter was dated January 27, 1923; Mr. Hoover's letter.

Mr. BENNETT. Prior to the ratification, I might add, by any of the States.

The reason for Mr. Hoover's statement appears rather clear when we look at the interpretative material which is available to us from that period. To begin with, let us look at the historical situation of the Colorado River when the negotiators sat down to negotiate the compact. At that time the appropriators in California in particular had already developed enough uses of that river so that they did not have a safe yield in low-water years. That meant then that if further uses were to be developed in the lower basin there would have to be some large-scale storage provided.

The upper-basin States were resisting that movement to bring additional storage. That, of course, was of great concern to California. California was vitally concerned with the development of additional storage, such as Hoover Dam later provided.

At that time the exact site of the dam and the resulting reservoir had not been determined. Now, why did the upper-basin States resist the desires of the lower-basin States for storage? The reason lies in certain basic principles of appropriative water law which were apparent to all those who were concerned with this problem at that time.

California and Arizona, particularly California, were developing at a very rapid rate so far as the consumptive uses of water were concerned. The upper basin States for economic and climatic reasons were developing much more slowly. As additional reservoir sites were developed in the lower basin, it was the fear of the upper basin that by date of priority those reservoirs would provide a basis upon which eventually the lower basin States might acquire the rights to all or nearly all of the river, subject only to what very small development might have taken place in the upper basin prior to the time that these various storage developments came into the picture. They had real fears underlying their opposition to that storage development in the lower basin. In particular, there was litigation pending before the Supreme Court, the nature of which was known by the negotiators. That litigation led to the famous decision of the Supreme Court in *Wyoming* v. *Colorado* (259 U. S. 419), which was decided in 1922, the very year that the compact was negotiated. The Honorable Delph Carpenter, after considering the opinion of the Court which applied a strict rule of priority of date of appropriation as between conflicting claimants in Wyoming and Colorado, said in a legal memorandum which was attached to his official report to the Colorado State Legislature, as follows:

> The upper State has but one alternative, that of using every means to retard development in the lower State until the uses within the upper State have reached their maximum.

There you have the nub of the reason why the lower basin States were willing to sit at a table and negotiate with the upper basin States.

Senator ANDERSON. Will you read that again, please?

Mr. BENNETT (reading):

> The upper State has but one alternative—

that is, namely, to this decision of *Wyoming* v. *Colorado*—

> that of using every means to retard development in the lower State until the uses within the upper State have reached their maximum.

Now, the lower basin States wanted the assistance of the Federal Government in terms of building a dam such as Hoover Dam. At that time the actual site of such a dam had not been determined by the appropriate engineers.

But this matter of history to which I have referred, which must be looked at in interpreting the provisions of the compact, will be found substantiated by contemporary statements from Commissioner Emerson, of Wyoming, the citation there would be page A–123 of the document I referred to previously; Legal Adviser Sloan, of Arizona, in a published statement appearing at page A–65; the statement I referred to previously by Herbert Hoover, representing the United States, at page A–37; and a statement by the Honorable Delph Carpenter which appears on page A–80.

Now, in the light of that history, it is our conclusion that article III (e), dealing with this so-called prohibition on the withholding of water bars only arbitrary and unreasonable withholding of water and in the light of article III (d) of the compact, the storage project which is pending before this committee for authorization is not an arbitrary withholding of water.

Herbert Hoover said, referring to this very provision upon which Governor Johnson bases his conclusions:

> This paragraph applies only to an unreasonable or arbitrary withholding or demand. I do not anticipate either arbitrary action or unreasonableness on the part of any of the States concerned. The upper States can gain nothing by withholding water not needed, nor can the lower States gain by demanding water for which they have no use. The paragraph is of value as an expression of the prohibition of such action but I doubt if it is ever called into practical effect. (P. A–39, the Hoover Dam documents.)

The very purpose of the project which is pending before this committee for authorization is to equalize the flow of this river at Lee Ferry. In that way it is proposed that the upper obligation shall meet the obligation under article III (d) not to deplete the flow at Lee Ferry below 75 million acre-feet in any continuous 10-year period.

The intention of the plan pending before this committee is not to store water which is not reasonably necessary to meet this obligation. This seems clearly to be anything but an "arbitrary withholding" in the words of Mr. Hoover.

The obligation of the upper division not to withhold is certainly no broader than the right of the lower basin to require the delivery of that water. The meaning of the prohibition on the upper basin should be measured by anyone reading that section of the compact only in terms of what it means so far as the rights of the lower basin to require the release of that water is concerned. Unless the lower basin can reasonably use that water for agricultural or domestic purpose it cannot demand the water. That appears very clear.

For example, it seems obvious that the lower basin could not demand the release of that water solely for the purpose of generating power at Hoover Dam. As Delph Carpenter said:

> It should be construed with paragraph (b) of article IV.

In other words, according to Mr. Carpenter, the compact means that power claims by the lower basin cannot compel the upper basin to turn down any water which cannot reasonably be applied to domestic and agricultural uses in the lower basin. This permits the first use of the waters of the upper basin for the generation of power,

limited only by the agricultural and domestic demands in the lower basin. The apportionment of water to the upper division States is made, to use the language of the compact, in perpetuity. It is submitted by the Department that that apportionment in article III (a) of the compact would be largely a nullity if the upper division States are denied the right to store water to equalize the commitment made under article III (d) of the compact. It would mean that the upper division States could store only water which could be put to use directly for agricultural and domestic purposes in the upper division. These will be very small reservoirs, relatively speaking.

In drought periods then these upper reservoirs would have to be emptied to fulfill the 75-million acre-foot commitment to the lower division. It is submitted that this is not a reasonable interpretation of article III (e), which the Honorable Herbert Hoover stated was meant to prohibit only unreasonable storage of waters. It is inconceivable that the apportionment to the upper division could ever be fully utilized under this interpretation of article III (e) of the compact.

The second basic question raised by the statement of Governor Johnson would prohibit the generation of electric power in the upper basin from waters which could not be used for domestic and agricultural purposes in that basin. In other words, the upper division States would be denied the right to use the water as it flows down the stream to the lower basin States for the purpose of generating electricity, however temporarily that water might be stored in order to accomplish that purpose.

The upper division States have the right to impound water for generation of electricity subject to the provisions of the compact, including the provision that agricultural and domestic purposes are specifically made dominant purposes under the compact.

Article IV (b) of the compact states as follows:

> Subject to the provisions of this compact, water of the Colorado River system may be impounded and used for the generation of the electric power, but such impounding and uses shall be subservient to the uses and consumption of such water for agriculture and domestic purposes and shall not interfere with or prevent use for such dominant purposes.

Now the language of IV (b) is not limited in any way whatsoever so far as one division of the basin is concerned. It is a provision which applies equally to the upper division and the lower division. It establishes a paramountcy of water uses, a paramountcy which is given to domestic and agricultural purposes. That was established policy under reclamation law from the beginning of its origins and also was embodied in the State laws of, I believe, every State in the basin.

There is nothing new or unusual in the words of this article IV (b) of the compact. It was not intended in any way whatsoever, in our judgment, to impose some new and novel limitation on the use of the waters of the Colorado River in the upper division.

We do not and cannot interpret the language in that way.

There is no limitation whatsoever in that language as to where power might be generated in the river. There is no mention whatsoever of either of the divisions of the basin. It is a provision which applies equally to the two divisions.

Article III (a) of the compact apportions exclusive beneficial consumptive use of 7½ million acre-feet per annum to each basin.

Senator KUCHEL. Is that your interpretation, there is no question in your mind that 7,500,000 acre-feet are allocated to the upper and lower basins annually.

Mr. BENNETT. I would say this: The apportionment in article III (a) of the compact is an apportionment to both basins equally and on a parity, subject only to limitations and restrictions as reasonably interpreted from other provisions of the compact.

Senator KUCHEL. Do you intend to comment on the other provisions, Mr. Bennett?

Mr. BENNETT. I have been commenting on a number of them as I go along.

Senator KUCHEL. I mean in connection with this 7½ million because I think that is one question that is in dispute around here.

Senator ANDERSON. I do not want to interrupt. But since you have had one interruption, do you intend to deal with IV (c)? You dealt with IV (b) and said it was not unusual, it was the usual law of the land. I differ from what Governor Johnson says as to the purpose of IV (c). I hope that sometime you will comment on that.

Mr. BENNETT. My notes from which I am talking here do not include that. It was a new point which was raised this morning. I am prepared to comment now in a general way but I would rather hold that up until tomorrow.

It is very clear from the contemporary materials that the compact does permit the generation of power anywhere on the stream. In that connection I call your attention to statements of the Honorable Delph Carpenter of Colorado which will be found on page A–102 of the House document referred to previously. Also, you will find similar remarks by Mr. Sloan of Arizona, which will be found at page A–74 of the House document.

In speaking of the compact as a whole, the representative for the United States, the Honorable Herbert Hoover, said at page A–41 of that compilation:

> As a matter of fact the power possibilities of the river are in no way diminished by the compact unless it is assumed that there is not to be an equitable division of the water.

It is very clear he would not have made that statement if he had believed that the provisions of this compact could reasonably be interpreted to deny the right to generate power in the upper division of the river basin.

Mr. Sloan, who was legal adviser to the Arizona Commissioner, said:

> There is no where in the compact any limitation upon the use of water anywhere for power except that such use in the upper basin may not limit or restrict the use of the water for agriculture and domestic uses in the lower basin.

As I explained before, that limitation was not novel; it is a limitation which has been written into the reclamation law.

Senator WATKINS. That is true in practically every State out in that area?

Mr. BENNETT. Yes.

Delpha Carpenter of Colorado expressed like views in his supplemental report to the Colorado legislature which will be found at page A–100 of House Document 717 of the 80th Congress.

In conclusion it is our judgment that the Colorado River compact contemplates storage and regulation of the flow of the river whenever and wherever reasonably necessary to realize the apportionments made in article II of the compact.

It is also our conclusion that there is no prohibition against the generation of electricity anywhere in the basin, subject to the paramountcy assigned to domestic and agricultural uses and provided that there is no interference with apportionments made in article III of the compact.

Senator ANDERSON. Thank you very much, Mr. Bennett. You have made a very fine statement. Naturally I am a little bit prejudiced. I think it is an extremely good statement.

Senator WATKINS. This was merely a restatement of what is generally accepted as the policy in practically all the Western States or practically any other place because of the fact that water used for development of power is nonconsumptive use. It does not interfere with water for agricultural or domestic purposes unless it is in some way restricted or impounded.

Mr. BENNETT. That is correct.

Senator KUCHEL. Mr. Bennett, is the opinion that you just gave to the committee the opinion of the Department of Interior on these points?

Mr. BENNETT. I have been delegated by the acting solicitor to speak for the department with reference to the two questions to which I have limited my attention.

Senator KUCHEL. Does the Attorney General of the United States agree with that opinion?

Mr. BENNETT. I would not be aware of that. I can say this, sir, that so far as we know neither one of these questions are in litigation at the present time. It should be remembered that the upper division States have not been joined in that litigation to date between Arizona and California, and in our judgment they could not reasonably be considered as issues before the Supreme Court in the present posture of that litigation.

Senator KUCHEL. Do you have any comment to make on the two subdivisions of article III (d) as against (a) and do you have any opinion on whether III (b) which was the subject of Governor Johnson's discussion here takes precedence over any rights of the upper basin under III (a)?

Mr. BENNETT. I would say this: we are of the opinion that the two must be read together. We do feel that, so far as the legislation before this committee is concerned, its very purpose is to make possible the regulated flow of at least 75 million acre-feet of water to the lower basin States in any continuous 10-year period.

I might call your attention, sir, to the fact that section 12 of the bill, which is pending before this committee, S. 500, in its first sentence, reads as follows:

> In the operation and maintenance of all facilities authorized by Federal law and under the jurisdiction and supervision of the Secretary of the Interior, in the basin of the Colorado River, the Secretary of the Interior is directed to comply with the applicable provisions of the Colorado River Compact, the Boulder Canyon Project Act, the Boulder Canyon Project Adjustment Act, and the Treaty with the United Mexican States, in the storage and release of water from reservoirs in the Colorado River Basin.

That we intend to do, sir.

Senator KUCHEL. Now, Mr. Bennett, do you have any opinion as to whether or not the upper basin could withhold water for power purposes and power generation if it were required for reasonable use in the lower basin for agriculture or domestic purposes?

Mr. BENNETT. We believe very definitely, Senator Kuchel, as I believe my statement indicated, that such water would have to be released, if it were being held only for generation of power in the upper basin and there were reasonable requirements for agriculture or domestic uses below.

Senator KUCHEL. Would your opinion be the same if you assumed that the water was surplus in the dam?

Mr. BENNETT. The use of the word "surplus" is the difficult problem there. The word "surplus" has been used in a number of different ways in connection with different sections and articles of this compact. I am most reluctant to discuss the meaning of "surplus," inasmuch as it is very much in issue before the Supreme Court, unless I know exactly what you mean by "surplus."

Senator KUCHEL. Let me try as best I can to indicate it. Let us assume that there is no question of water flowing through Lees Ferry which is necessary for rights of prior appropriation. Secondly, for the responsibility of the upper State to meet the commitments to the lower States, and to that extent under this question you would find X acre-feet of water in the Glen Canyon Dam above the need of the upper basin under the compact. That would be my general thinking about what I would mean by the word "surplus" there.

Mr. BENNETT. I would say this, Senator, that waters which are available, and which are reasonably necessary, for storage in order to meet the commitment of the upper division to the lower division States would be subject to storage under most circumstances.

Senator KUCHEL. There again I assume subsection (e) of article III is relevant?

Mr. BENNETT. Subsection (d) of article III?

Senator KUCHEL (reading):

> (e) The States of the upper division shall not withhold water, and the States of the lower division shall not require delivery of water, which cannot reasonably be applied to domestic and agricultural uses.

Mr. BENNETT. To us it is clear that if that water is reasonably required for agriculture and domestic purposes in the lower division it probably would be subject to call with one possible qualification, Senator. That is this: The lower-division States have storage capacity with which you are very familiar. They have Lake Mead available to them. Article VIII of this compact expressly provides that those perfected rights existing as of the date of the compact shall be applied to such storage as might be available in the lower basin after 5 million acre-feet of such storage capacity became available.

I think the question whether that water would have to be released to the lower-division States would depend entirely on whether the lower-division States could make a showing that the waters available in Lake Mead would not reasonably meet the domestic and agricultural purposes for which water was needed.

Senator KUCHEL. And assuming that showing could be made, then you would unhesitatingly say that water would flow through Lees Ferry?

Mr. BENNETT. In my personal opinion, I think that is right, sir.

Senator KUCHEL. Would your answer be the same if the flow in that year period had been 7½ million acre-feet at the time the demand was made and could be reasonably shown as necessary for agriculture and domestic purposes?

Mr. BENNETT. At that point I would want to reserve judgment. The bill requires that the releases be made in accordance with the Colorado River compact.

At that point you might well have a conflict between the reasonable requirement of the upper basin for storage to meet the 10-year commitment under article III (d) and lower-basin uses of surplus, as referred to in article III (f) and III (g) of the compact.

Now at that point I would not want to give you an unqualified answer. The question of what is meant by "surplus" is obviously in litigation between Arizona and California, surely.

There are a number of statements in the supporting materials with reference to the Colorado River Compact which indicate that this compact does not create any vested rights, itself, so far as uses of surplus waters are concerned, whatever that terms "surplus" might mean in the connotation that it has under the provisions of article III (f) and article III (g) of the compact.

Senator KUCHEL. Could you and the department give the committee an opinion in answer to those questions?

Mr. BENNETT. I think the opinion on those questions, sir, would probably have to come from the Department of Justice, in view of the litigation before the Supreme Court.

Senator KUCHEL. Would you say that an answer to them was relevant to a discussion of the bill before us, S. 500?

Mr. BENNETT. I would say not, Senator Kuchel. Our engineers advised me no later than an hour ago that the present uses of water in the lower basin are something over 6 million acre-feet. It would depend, I should think, a great deal on what further developments are impending in the lower basin before they reach a use of 7½ million acre-feet of water. I do not believe it is material to this legislation.

Senator KUCHEL. I would think, and you are far more of an expert on this than I am, I would think, however, that it would be of extreme importance to the lower basin to have some indication from the department as to what its judgment would be in those instances.

You are dealing with an area that is increasing in population with terrific rapidity and I think that it is quite conceivable that that kind of contingency could arise. I would hope that we might have the benefit of the Department's thinking on that.

Mr. BENNETT. Mr. Larson testified yesterday that there were several ways of filling Glen Canyon Dam. One of them was to rely on the extremely high-flow years. I should think offhand that we, as reasonable men, would say that it would be a long time before California and Arizona uses reached 13 or 14 million acre-feet of water a year which might be available for storage in high-flow years.

They certainly will never do it with reasonable assurance of a safe supply of water.

Now, that being the case, we know that there are extremely high-flow years, we know that there are extremely low-flow years. Now, under those circumstances, if you will go back and review the testimony of Mr. Larson yesterday, I think you will realize that there is a great

degree of flexibility in the possible handling of the operating problems connected with filling Glen Canyon Reservoir.

Senator KUCHEL. I think there is a great deal of truth in what you say. Again, for the record, if the Department were able, I would like to have some comment made on the interpretation of that problem and how it would answer from a legal standpoint because it would have the responsibility of administering this program.

Mr. BENNETT. I think one answer to that, Senator, is that we are confident that this committee and the Congres will write provisions in this legislation which will adequately protect the interest of the lower-basin States. The form of such provisions will depend largely on the type of reasonable protection which the lower division wants.

If it is their purpose to secure amendments which will assure an adequate, equitable administration of this project, we at the Department are prepared to cooperate with the committees of the Congress in putting such provisions into the legislation.

Senator KUCHEL. I think the chairman, for example, if he had sat in 1922 would have taken some objection to the exact language of subdivision (d) of article III, to say the very least, and if there could be answers given on a problem such as this in anticipation of future development I think we ought to have them.

Senator ANDERSON. You know Browning's comment on his poem. He wrote it. He knew what it meant and God knew what he meant but only God knows now. At the time they wrote the compact the people writing it thought they knew what it meant.

Are there other questions?

Senator BARRETT. I just want to ask this one question, Mr. Bennett. The compact itself provides that electricity may be generated in the upper basin States so long as it does not unreasonably interfere with the use of the water by lower basin States for agriculture or other domestic purposes.

It must naturally follow then from such a statement that the upper basin States would have the right to store the water for that purpose; does it not?

Mr. BENNETT. Correct, sir. That is the burden of the statement I made this afternoon. That is our interpretation of article III (e) of the compact.

Senator BARRETT. And storing it for that purpose does not make surplus water?

Mr. BENNETT. Not a bit, sir, under our interpretation.

Senator ANDERSON. We will be in recess. Just a moment. We will start at 10 o'clock tomorrow morning. The Honorable Val Peterson, Civil Defense Administrator, has a short statement to make. Congressman Dempsey who has been here this afternoon for a long time will be given an opportunity. Then welcome to the Wyoming spokesmen, the Utah spokesmen and some other groups we have asked to appear. I think that Mr. MacDonald was here today and probably Mr. Fain. We will try to get to them tomorrow.

I think this is probably as far as we should go this afternoon. We will recess until 10 o'clock here tomorrow morning.

(Thereupon, at 4:30 p. m., the subcommittee recessed to reconvene at 10 a. m., Wednesday, March 2, 1955.)

COLORADO RIVER STORAGE PROJECT

WEDNESDAY, MARCH 2, 1955

UNITED STATES SENATE,
SUBCOMMITTEE ON IRRIGATION AND RECLAMATION
OF THE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS,
Washington, D. C.

The subcommittee met at 10 a. m., pursuant to recess, in the committee room, 224 Senate Office Building, Senator Clinton P. Anderson (New Mexico), presiding.

Present: Senators Clinton P. Anderson (New Mexico); Joseph C. O'Mahoney (Wyoming); Eugene D. Millikin (Colorado); and Arthur V. Watkins (Utah).

Also present: Senators Alan Bible (Nevada); Thomas H. Kuchel (California); Frank A. Barrett (Wyoming); Barry Goldwater (Arizona); and Gordon Allott (Colorado).

Present also: Stewart French, staff director and counsel; Goodrich Lineweaver, staff member for reclamation; William K. Coburn, staff member for public lands; James Gamble, staff member for Indian affairs; Richard L. Callaghan, chief clerk; and N. D. McSherry, assistant chief clerk.

Senator ANDERSON. The meeting will be in order.

We are happy to welcome this morning Mr. Val Peterson, who will give us a statement on the Colorado Basin. We are happy that his duties are now to look after civilian defense. We realize the extreme importance of it right now.

Senator WATKINS. I do not know whether the Governor is in a position to say that he is speaking for the administration, or not, but I would like the record to show that I invited and urged him to come and give us the benefit of his views and if he is now in a position to speak for the administration, he can make that known.

Senator ANDERSON. We are very happy to have you here, and, Senator Watkins, we appreciate your great interest in this. You do not have to apologize for your interest which compels somebody to come here and appear.

Senator WATKINS. I wanted to make it clear that he was not volunteering.

STATEMENT OF HON. VAL PETERSON, ADMINISTRATOR, CIVIL DEFENSE ADMINISTRATION

Mr. PETERSON. Mr. Chairman, I am pleased to accept the invitation to appear here and, of course, it is my responsibility to represent the administration in civil defense.

If it is your pleasure, I shall read a brief statement here and then I shall be glad to attempt to answer questions, if you care to direct any toward me.

I am here today in response to an invitation to appear before this committee to discuss civil-defense benefits which would result to the Nation from the development of the upper Colorado River Basin.

While I have for many years been tremendously interested in resources development, particularly in my own region, the Missouri River Basin, it would neither be appropriate in view of my present assignment, nor possible because of lack of time to familiarize myself with the subject development, to attempt to discuss this matter on its merits.

My interest today is in the features of the project that lend themselves to the survival of the United States in time of war. I am, of course, familiar with the President's desire that the development go forward in the national interest.

In this nuclear age, if an attack is made on the United States, it will be necessary, first, to get our people away from our critical target areas, our great centers of population and industry, and if a city is hit by a hydrogen bomb, we will not be able to reenter for some time, and possibly never.

Second, the time is here for us to think about constructing or developing locations where vital or sensitive industries and facilities will be more secure.

I call your attention to the work that Russia is reported to have done in developing a second line of industry behind the Ural Mountains.

Too, I have had the privilege of visiting many of the underground defense plants and military installations in Scandinavia. I refer to such installations as the great Bofors armament works, to the SKF plant, as well as to air hangars and destroyer bases created in the rock.

While I am not proposing that our industries as such be relocated, I do urge that in expanding and extending our industries we should look to areas where they would be more difficult to attack.

The upper Colorado development by providing water and power would pave the way for taking care of those who by necessity may be forced to evacuate our west coast cities.

Please recall that immediately following Pearl Harbor, thousands of persons left the coast for safer areas. If an atomic attack came, this number would be multiplied many times over. It would be fortunate if we had areas with water and power facilities far removed from our vulnerable and heavily populated urban centers to which these people could go. The area in the upper Colorado Basin would be ideally suited for such a development.

Our expanding economy requires new sites for industry. If uranium is a coming source of power, it might be profitable for industry to locate near its source. If the oil-shale developments prove out, new industries should be located near the source of this fuel. The entire basin has great coal reserves as well as other minerals and raw materials. Water and power will be sorely needed for such developments.

The best and most comprehensive study of civil defense is that known as Project East River. It was made by the Associated Univer-

sities, Inc., for the Defense Department, FCDA, and the National Securities Resources Board, under the direction of Gen. Otto Nelson, now vice president of the New York Life Insurance Co.

The report is in large part concerned with the need for reducing the vulnerability of prime target areas.

The East River report made these significant points:

(1) Of the 96 million urban residents in the United States, 33 million live in the central cities of our 32 largest metropolitan areas, occupying an area equivalent to a square only 55 miles to a side.

That is, of course, the reason why we are so vulnerable to bombing.

(2) In 1947 these same cities produced one-third of the Nation's total industrial output (measured in terms of value added by manufacture).

(3) There would seem to be no necessity to labor the point of the attractiveness of American centers of population and industry as target areas when one realizes that one-quarter of the population of the United States is concentrated in the 12 largest cities and their immediate environs.

(4) The potentially fatal vulnerability of concentrations of industry and people is increasing year by year.

It is about time that we reverse this trend, for the balance of victory between two military powers may well rest with the Nation whose civilian population can best minimize the effects of an atomic attack and get up off the ground, organized and ready.

It seems to me that a project such as the upper Colorado River storage project is a step in the right direction. I therefore endorse S. 500.

Thank you, Mr. Chairman.

Senator ANDERSON. Thank you, Governor. That is a fine statement.

Are there any questions?

Senator WATKINS. Mr. Chairman, I would like to ask Governor Peterson whether he is acquainted with the area in the upper Colorado River Basin. I know you are from Nebraska. You were the Governor of Nebraska a number of years ago.

Are you acquainted with the area of the upper Colorado?

Mr. PETERSON. Yes; I am acquainted with it. I hesitated a little bit, Senator, because it has been my privilege to be over every foot of the Missouri Basin studying reclamation, irrigation developments, flood control, power developments, and all that sort of thing.

In this basin, of course, I do not have that acquaintanceship, but I have been over it.

Senator WATKINS. You have flown over it and have been able to observe it from the air and have driven across it in automobiles or on the train?

Mr. PETERSON. That is right, sir.

Senator WATKINS. Now, in planning to evacuate the citizens of this country from target areas—let us make that specific; let us take southern California, for instance, to begin with, in the area around Los Angeles, San Diego, and that area, where would be one of the natural outlets for that population in the event it would be necessary to evacuate?

Mr. PETERSON. In southern California some of those people would have to be accepted over in the Arizona Valley, the Phoenix, and Tucson area.

In northern California, certainly the San Francisco-Oakland Bay area, it would seem that those people would move over to the east over the mountains and into the Nevada, Idaho, and Utah area.

There might be some movement in both directions. Some of the people in southern California might find it advisable to go north in the same area we are speaking of here.

Senator WATKINS. If you evacuated in large numbers it would be necessary to use a number of those States.

Mr. PETERSON. That is correct.

Senator WATKINS. So there would not be too much dislocation in the lives of the people of the area from which they would be taken.

Mr. PETERSON. The problem is more difficult for evacuation of the people on the west coast than it is in the Chicago area. In the Chicago area we believe that we could absorb the millions in Chicago within about 100 miles of Chicago in the villages and cities that would remain standing following an attack.

In the California area because of the large concentration of population there and the fact that there aren't many people immediately to the east, the evacuation of those people would be difficult and they would have to go a longer distance and certainly they could not remain in the desert area.

Senator WATKINS. Of course, it is practically all desert east of California and even in the eastern part of California.

Mr. PETERSON. Eastern California.

Senator WATKINS. That is right, until you get to the mountain areas.

Now, in respect to this problem of fallout from the effects of hydrogen bomb, would the mountain area be an attractive place to take the people from California because of that situation?

Mr. PETERSON. Well, provided that there were caverns or caves or cover that they could take in that area. I am not familiar enough with the area to know whether there are natural coverns or caves they could get into, but those could be provided in that type of terrain quite easily.

Senator WATKINS. As I remember the news stories that have been released, and I think possibly Mr. Strauss' statement, Mr. Strauss of the Atomic Energy Commission, that the fallout is dangerous in areas up to 300, 350 miles.

Just to refresh your recollection, I indicate it is probably about 700 to 750 miles from southern California to the Utah areas and the same from San Francisco into the more populous areas of Utah, Idaho, and Colorado.

And with your westerly winds bringing it over the fallout would probably all be dissipated in the desert area between the Coast and Mountain States; would it not?

Mr. PETERSON. I think that is correct. I assume some strange things can happen with respect to fallout, but ordinarily that seems to be correct.

Senator WATKINS. This is in keeping with what has been released by the Atomic Energy Commission itself.

Mr. PETERSON. That is correct.

Senator WATKINS. Now, to stop in California, to the east of those cities within a 300-mile area, that would be downwind and that would be a very dangerous area to take people into.

Mr. PETERSON. We would try not to evacuate downwind. It may be that in some parts of the United States we would be forced to evacuate downwind. There may be overlaps because the fallout pattern for one city may occur over another city.

I think it is true, Senator Watkins, it appears that there are areas in Idaho and Utah, assuming Salt Lake City were not bombed——

Senator WATKINS. Wyoming and Colorado are still farther away, which would give a still better opportunity and New Mexico as well.

Mr. PETERSON. Yes. I was going to say there are areas apparently in Utah and Wyoming and Idaho and possibly New Mexico. Assuming that Salt Lake City itself were not bombed or assuming that certain airbases in New Mexico were not bombed, it would seem that there is an area in there that might escape fallout.

It is conceivable that those areas would escape completely.

Senator WATKINS. Unless there is new information that comes out, the fallout is going to be carried a longer distance, where it would be dangerous a longer distance away from the bombed area, it would appear that this area would be very desirable?

Mr. PETERSON. That is right.

Senator WATKINS. The area I am talking about, the Intermountain States.

Of course, in any bombing of that area, the fallout would be to the east downwind, that is in the ordinary course of the winds that we have in that area.

Mr. PETERSON. That is correct.

Senator WATKINS. Now, with respect to the industry itself, you mentioned new industries and expansion of present industries.

I am referring now directly to new defense industries. What would be the policy of your Administration, the Civil Defense, with respect to recommendations for the establishing of these new defense industries?

Mr. PETERSON. Of course, we believe that it is indefensible for this country to continue pyramiding industry in these great target cities as I alluded to in statements from Project East River.

We are too concentrated now and we must spread these things out if we hope for this country to survive following the kind of attack the Russians may be capable of making on the United States.

I certainly would not suggest that we pick industry up and move it. I don't think that is feasible. It would cause too great an economic dislocation; it would upset tax structures. But we are constantly expanding industry in the United States and it seems to me that those expansions certainly should be located in secure places of this type and some of those installations should be underground or constructed in the sides of mountains.

In other words, this should be done.

Now, the main responsibility in this field, however, Senator Watkins, rests with the Office of Defense Mobilization and under the authority that the Office of Defense Mobilization has it is permitted to grant certain benefits to defense industries that will comply with the standards established by the ODM in this regard.

In other words, it gives industry certain rapid tax amortization benefits.

Of course, ODM has exactly the same interest in this that Civil Defense has.

Senator WATKINS. What is their policy with reference to extending these tax benefits in connection with the establishment of new industries?

Mr. PETERSON. Previously their policy has been that to qualify for these benefits an industry must be located 10 miles outside of the perimeter of an assumed target area.

However, that is now being modified and it is the plan of ODM to make an individual study in each case. The reason for that is that 10 miles is no longer a suitable limit.

In other words, with these tremendously big megaton bombs, a bomb might create an area of such destruction that 10 miles would not give you safety.

It appears now, rather than picking any certain number of miles, 25, 30, or 40 miles, that it is better to treat each industry, each applicant on a separate basis.

I am certain that Dr. Flemming and his organization—and they are well capable of speaking for themselves—would be very sympathetic with anything that would contruct new industry in noncongested areas and underground and in safe and secure locations.

Senator WATKINS. With your knowledge of the mountains—the answer to this probably would be obvious—but where you have those straight up and down mountains of solid rock in the Intermountain States, wouldn't that answer the needs better than probably any other place in the United States for going underground?

Mr. PETERSON. I think it would answer them in a very fine manner.

Of course, if someone were to drop a hydrogen bomb directly on an installation out there, even though it were a couple of hundred feet below the surface of the earth and in rock, it probably would be destroyed, but the advantage you have there is——

Senator WATKINS. May I call your attention to the fact that we have places in my State, and I am sure in Colorado, I have seen a great part of that, and Wyoming, where the gorges are so deep they could go in level from the ground straight in and they would be several thousand feet below the ground.

Mr. PETERSON. In case I am close to one of those devices I would like to be in such a place. I think one would have a good chance of surviving.

I want to point out that if you are at the immediate point of the explosion of a thermonuclear device, or hydrogen bomb, being under a couple hundred feet of rock probably would not be sufficient protection, but under the circumstances you allude to, it would seem that it would be.

Senator WATKINS. I know in my State, and in Colorado, there are numerous places where you could find two or three thousand feet depth of rock above you.

Mr. PETERSON. I think there is another factor, too, and that is if you get in the mountains it is more difficult to find places of this type and it makes enemy bombing more difficult.

So there is that benefit in addition to those that come from the cover of the rock.

Senator WATKINS. It is possible to put all these hydroplants underground and in the walls of the canyons.

Mr. PETERSON. That is right.

As a matter of fact, that is being done in Norway and Sweden now. I have visited those installations. In Norway and Sweden, for the last 2 or 3 years, industry has been going into the mountains and into the rock, and I have seen complete powerplants under rock; telephone plants, one municipal water system completely under the rock; the great Bofors factory which I pointed out, which uses two principles of passive defense. It is scattered over 25 miles on the surface of the earth, and the sensitive parts are deep down in the earth.

The SKF factory I mentioned is one of the great ball-bearing manufacturing plants in the world. They have the sensitive parts of it under the rock.

The AFGA maritime manufacturing people are partly under the rock, as are many other manufacturers.

Of course, there are two or more fighter-plane installations under the rock just outside of Stockholm; also, of course, places where destroyers are slipped under the rock.

In other words, those two countries are going under the rock very rapidly.

Interestingly enough, the Scandinavians have discovered you can create a cubic foot of space in rock for just a little more than it costs to create a cubic foot of space on top of the earth in a building of the industrial type. Because it is cheaper to maintain space in the rock than it is on top of the earth—for obvious reasons you get away from the elements—they can amortize the capital cost plus the maintenance cost over a 30- to 50-year period. They find it cheaper to be under the rock than to be on top.

Now, I am not selling these underground caverns, but I do suggest that that is the Scandinavian experience, and there is quite an extensive literature in this field in Scandinavian countries that might be of interest to the people from the Colorado Basin development.

Senator WATKINS. Do you happen to have any of it available? It is not available to us at the moment. We might get it from the Embassies of these countries.

Mr. PETERSON. I don't know, but I will be glad to supply it.

(The information referred to not available.)

Senator WATKINS. As I gather from your testimony, this idea that is being suggested here is not new.

In fact, it is being extensively practiced not only by the Scandinavian countries, but you mentioned Russia going behind the Urals with some of its industries.

Mr. PETERSON. Of course, Hitler caused the Russians to take that action in World War II. The Swiss are also doing this, although we don't know as much about what the Swiss are doing. They are somewhat more secretive about their operations than the Scandinavians are, but this sort of thing is being done in several places in the world.

Senator WATKINS. It would be of some advantage, of course, to have a place in the event it became necessary to do some of these, so-called, sort of drastic things that have been mentioned here today.

Mr. PETERSON. That is correct.

Senator WATKINS. Another question that would seem obvious, at least the answer would be obvious, that is with respect to the needs for electric power and water and natural resources that could be used by the industries, new industries particularly, that would be set up in these areas.

I take it for granted that it would be, of course, it should be obvious, that we will need power and we will need water to operate and this project will furnish both of those in rather large quantities, that can be used for those purposes.

Mr. PETERSON. We are going to need water desperately following a nuclear attack. The mayor of Detroit is on our National Civil Defense Advisory Council. We are concerned, he is concerned, and I am concerned, about how you would provide sufficient water for the people of Detroit assuming that you moved them out of Detroit and then Detroit was destroyed. How would you have enough water, in the area that would have to absorb those people, to take care of the needs of the people.

It presents a tremendous problem.

Water is becoming one of the most, I was going to say becoming one of the most precious commodities in America; I guess it is one of the most precious commodities in America right now.

We need every bit of it we can get. You must bear in mind, Senator, that if we have a nuclear war, and the San Francisco area is attacked and the Los Angeles area is attacked, which they are certain to be in the event of war, it is questionable, if they are attacked successfully, when we could return to those areas, or if we could ever return to those areas.

In other words, the destruction that would be wrought by a hydrogen explosion there, plus the persistence of the radioactivity, might be such as to deny entrance into that area for a long, long time.

We don't have enough information presently about the persistency of radioactivity to know how long that area would be denied to reentry on the part of humans.

But, at any rate, assuming you were able to evacuate those people before the bomb detonated, you would have millions of people who would have to be taken care of indefinitely and actually relocated for an indefinite period of time.

Now, I do not like to talk about that because it is rather an unpleasant prospect, but it is one that America must face up to.

Senator WATKINS. As a matter of fact, the coast area is open to two lines of attack, is it not? Probably the major attacks might come by air, but it is still open to attack from the submarines or surface vessels operating off the coast. Those cities are all so close to the area where the submarines would operate, that with guided missiles and other weapons they could be attacked with atomic bombs or even the hydrogen bombs.

Mr. PETERSON. I think that is true. I do believe it is true that our Navy is making rather rapid strides in protecting us with respect to submarine attacks; nevertheless, it is a possibility. That is right.

Senator WATKINS. I hope it never happens that we ever have those cities attacked, but I am talking about the possibilities and the need for having at least a second line of defense, or an area where we can take people.

It has seemed to me for many years that development ought to go on in those intermountain States under the present situation that exists in the world without any reference to the desires probably of the people in those States themselves. It would be a great benefit to southern California, all of California, and the entire Pacific coast, to have the intermountain area developed and have those resources in such shape that they could be used immediately upon an attack being threatened or after an attack has taken place and people have to be evacuated even on a semipermanent basis.

That is one reason why I think your testimony is very, very important to us today. We all hope and pray that these attacks will never come and we will find a way to keep peace on this earth, but in the event we do not, and that is the thing we have to look out for; that is the insurance we must take, as much as we can get.

No place will actually be safe; that is true, but there will be a relative degree of safety among those various areas, but we have to take the steps to bring about as much as we can whatever protection we can get in this country.

I cannot conceive of any better place than the mountain areas. It is difficult to find them in the nighttime, unless they had an absolute chart or map of that area, they would have a difficult time.

I think it is pretty much out of the reach of the guided missiles at least for a time, some seven hundred miles from the coast.

Mr. PETERSON. Senator, some atomic scientists, said in 1945 at the time of the construction of the first atomic weapon, that the only hope of survival over the long pull was dispersal. This is simply part of that dispersion project.

If America is serious about survival in the nuclear age, then America must disperse. We have no other choice. If we are not serious, if we want to just live in a make-believe atmosphere, assuming that these things never are going to happen, and dismissing them that way, then, of course, we can continue to pyramid our industrial facilities and wait to see what the future brings.

Senator WATKINS. The west-coast States are also heavy producers of food products. What would the effect of bombardment there be on the food supply of that area, upon the production of food in that area?

Mr. PETERSON. I am not familiar with that exact point. I can say this: That the way our cities and our industrial facilities and our distribution facilities were constructed made sense in the age in which they were constructed.

Of course, no one could foresee this nuclear age and nuclear weapons. Take, for instance, that bay area again, the great commercial warehouses, the food warehouses are right on the waterfront; they are right down in the bay. If there is a nuclear attack, those great food concentration points are gone.

The sad thing about it is that in these great harbor areas of ours, in these great city areas, we have not only great concentrations of food supplies, but we have our great money centers; we have our great petroleum concentration points, railroads, great railroad terminals, and banking facilities.

If an attack comes in the United States on 30 or 40 or 50 of these places, it would destroy these great facilities, deny them to the American people, create tremendous confusion and chaos.

While I do not believe that it would be a knockout blow for the United States, nevertheless, it would cause a tremendous turmoil in this country. The reason I say it would not be a knockout blow is because if you attack the 70 leading metropolitan complexes in America, a metropolitan complex being the bay area of Richmond, San Francisco, Oakland, Alameda, you have attacked 70 million Americans. You have attacked 92 cities, and 70 million Americans, but even if you are successful you have destroyed just 3 percent of the real estate in the United States and there is a tremendous amount of the United States outside of those areas.

I believe we can survive. As a matter of fact, we must survive because if we don't, freedom has departed from the earth.

Senator WATKINS. Senator Kuchel, do you have some questions?

Senator KUCHEL. Yes.

First of all, Governor, I think you will agree that the people who reside in the San Francisco Bay area, indeed, the people of California as a whole, are painfully aware of the need for an adequate program of civil defense.

Mr. PETERSON. Yes, sir; and if I may add, Senator, California has been one of the leaders in the Nation in this field.

Senator KUCHEL. Yes, sir.

Now, we deal here today with a piece of legislation that is quite involved. I am sure you are aware that in 1922 the so-called 7-State compact was negotiated and subsequently ratified, by which the 7 States in the upper and lower Colorado River Basin attempted to arrive at an agreement with respect to the waters of the Colorado River.

Specifically, we deal here today with S. 500, which provides for the congressional authorization of a number of named projects, a number of others which are unnamed.

I think I can say to you that there are some reasonable people who have raised some questions as to whether or not the bill before us would breach the solemn compact which was previously entered into. This committee has as one of its responsibilities the determination of whether that question of breach is a valid one in part or in whole.

Now, I am sure by your own concern as the head of civil defense in this country you do not come before this committee to urge that S. 500 be adopted into law if it would result in the breach of a solemn agreement between the States.

That would be correct, would it not?

Mr. PETERSON. Absolutely. It would be presumptuous on my part as well as foolish to make any such suggestion.

Senator, if you are familiar with the statement that I submitted here in the beginning, I said that it would be inappropriate in view of my present assignment, and possibly because of lack of time to familiarize myself with the subject development, to attempt to discuss this matter on its merits.

In other words, I am not here as an advocate of this development excepting as it could relate to the security of our country, the defense of our country.

In other words, I am not prepared to debate the merits of the matter, the development of the individual dams, and that sort of thing. That takes great familiarity and the time and study that I have not been able to give it.

Senator KUCHEL. I think it would be fair, would it not, to say that it is not your desire to tell this Senate committee, of the American people, that congressional failure to adopt S. 500 would be a serious blow to civil defense in the Nation?

Mr. PETERSON. I would prefer to say, Senator, that I constantly tell the American people that we must disperse industry and should this bill on its merits make it advisable for the American people to carry out such a development, then I should be very happy, because of the advantage which it would offer to the country in terms of security and in terms of civil defense.

Senator KUCHEL. On the other hand, if the bill was found to be invalid on its merits and under those circumstances if it did not become law, your position to the American people would not be that civil defense had been dealt any serious blow?

Mr. PETERSON. I would not be in the position today, certainly, of suggesting that the project be undertaken for the purpose of civil defense only.

Senator KUCHEL. What I mean is that I think by reason of your governmental responsibility it is highly important that we know exactly what the position is which you take.

You frankly have stated that you do not come here to argue this bill on its merits and when you use the phrase that you favor the passage of S. 500, is it not a fact that you favor the passage of any legislation which in the opinion of Congress might develop other parts of the country?

Mr. PETERSON. I favor any resource development of this nature, assuming that it is sound.

Senator KUCHEL. And you make no comment on its soundness?

Mr. PETERSON. I make no comment on that. Assuming its soundness, I favor it because it adds to the security of the United States which is my responsibility at the moment.

Senator KUCHEL. So that, generally speaking, this statement stands for the proposition that your office believes that this country ought to be developed in a sound manner and to the extent that it is so developed it is in the interest of national defense and civil defense? Would that be your position?

Senator O'MAHONEY. Remember that you are talking about the upper Colorado River Basin, which is an area far greater than the State of Nebraska.

Mr. PETERSON. That is hard to contemplate, Senator.

Senator O'MAHONEY. And it is an area full of resources, resources that the Nation needs for civil defense and for military defense, as well.

I have just been glancing over your statement. I was sorry I was not here when you began, but I just did not want you to be intimidated by our very able friend from California.

Mr. PETERSON. I am certain that the distinguished Senator from California would not want to intimidate me. I assure, you, Senator, that Nebraskans don't intimidate easily.

Senator WATKINS. I was in hopes after what you just said, Governor, that the distinguished Senator, our young friend from California, would joint with us in asking the Congress to pass this bill, because Californians need it more than we do, or will need it.

I hope they never will, but there is always that possibility.

Mr. PETERSON. I would hesitate, Senator, to speak for California.

Senator KUCHEL. So that, generally speaking, this statement stands for the proposition that your office believes that this country ought to be developed in a sound manner and to the extent that it is so developed it is in the interest of national defense and civil defense. Would that be your position?

Mr. PETERSON. The answer to that question would be "Yes."

Senator KUCHEL. In other words, I want to say this: There is not a Member of the United States Congress, in my judgment, whether he is a Democrat or whether he is a Republican, who is lacking in patriotism and in a nonpartisan American desire to adopt civil-defense legislation wherever possible. There is no question about that.

We have made progress along those lines. We ought to continue to make progress along those lines.

But here in this committee there may be some, maybe just one, who might feel that this legislation poses a serious danger to a multiple State compact. I would not want anyone in this country to feel that a vote against any piece of reclamation legislation constituted opposition to a sound civil-defense program.

Do you see why I make that statement?

Mr. PETERSON. I would not want to see anyone placed in that position either. My assumption with respect to this development is that there rests on the shoulders of the proponents the responsibility for establishing the meritorious characteristics of this development.

There also rests upon them the responsibility for seeing that no interstate compacts are breached.

I am assuming they are honorable people and they would want to do that as all of us would want to see that that was done. I am only suggesting here if this country is going to survive in this nuclear age we simply must disperse industries. We must get industry underground. We must scatter it out.

While it is true as a proponent of resource development generally, and one who has spent many years in it intensely, in an important area in the United States, I favor such developments. Certainly I make no blanket endorsement and I would make no endorsement without careful study on my part.

Senator KUCHEL. Indeed, that is your reputation. So when you say that you do not discuss this matter on the merits, that means, does it not, that the merits of this bill have no concern with your general statement which you just made that there should be a dispersal of industry in America, et cetera?

Mr. PETERSON. No, sir. And with respect to the merits of this bill, I would feel that some of the distinguished men that I see around this table and whose names I see on this bill, would be well able to establish those merits.

Senator O'MAHONEY. Now, Governor, may I interrupt at this moment to ask, do you suppose you have the same definition in mind for the word "merits" that the Senator from California has? Do you not think that he is rather trying to trap you into a condemnation of this bill by using a word of broad significance in his mind, whereas what you are talking about includes merits like the development of the coal resources of this area, the development of the uranium that is likely to be found out there, and development of oil shale, millions

and millions of tons of which are in the States of Colorado, Wyoming, and Utah, which are part of this upper basin, while what the Senator from California wants to have you tell the committee is that you do not believe, or you have no idea as to whether or not this is economically sound, although the President of the United States has recommended it and the Secretary of the Interior, who is the responsible head of the Bureau of Reclamation and the bureau of Geological Survey has stated that it is sound.

Would you wish to be interpreted before this committee as expressing any doubt about the conclusions that these experts have reached with respect to that particular phase of the merits of the bill?

Mr. PETERSON. Senator, I stand on my statement in my opening paragraph in which I disqualified myself with respect to the merits of this matter. I stand on my statement as I have made it up to this time.

Now, as the Senator knows, or as the chairman knows, as an individual and as one who has spent 6 very energetic years of his life in resource development, I would undoubtedly have some opinions. But I don't believe that those opinions, and I am not usually timid about expressing my opinions, are particularly material.

That is my position, Senator O'Mahoney.

Senator O'MAHONEY. Now, get this definition of merits. Referring to your opening paragraph you say:

> It would be neither appropriate in view of my present assignment, nor possible because of lack of time, to familiarize myself with the subject development to attempt to discuss this matter on its merits. My interest today is in the features of the project that lend themselves to the survival of the United States in time of war.

Now, it is evident, is it not, from that statement, that when you were using the word "merits" there, you were referring to engineering and geological phases of the bill and not to the broad significance of the development of this area which you entirely favor.

Mr. PETERSON. I am familiar with the fact that under the appropriate procedures set up by the Congress and the administrative branch of our Government, that all of these projects are justified economically and engineering data is assembled and all that sort of thing.

I was not entering into a discussion of that because those things are well established, I assume are well established by the Department of the Interior.

Senator O'MAHONEY. In other words, you were putting that aside because you were busy on other matters?

Mr. PETERSON. That is right.

Senator O'MAHONEY. But you have assumed that the officials of the Government, whose duty is to carry on these particular aspects of it, are just as earnest in trying to carry on their work as you are in carrying on civil defense?

Mr. PETERSON. Absolutely so.

Senator WATKINS. If I got the right impression from your testimony this project does have tremendous merit as a defense project, a place to disperse industry and to evacuate people.

Mr. PETERSON. Correct.

Senator WATKINS. So when you were talking about merits you were using it in a limited sense as the chairman has already pointed out,

to the controversial problem between California and the upper basin States and the engineering and the other phases of it.

Mr. PETERSON. That is right.

Senator WATKINS. But from the standpoint of civil defense, it does have merit and a great deal of merit?

Mr. PETERSON. Correct, and I think the statement so indicates. Forcibly indicates, I think might be said.

Senator WATKINS. I think my friend from California, Senator Kuchel, would probably agree that it does have merits as a defense project.

Mr. PETERSON. I just did not want to be in the position of coming before this committee, with the limited amount of time I have had to familiarize myself with this project, and the fact that this assignment rests in other hands of the administration, and attempt to indicate enough familiarity with the problem to express a good, sound opinion.

Senator WATKINS. Assume this project were not already planned and had not been developed from the engineering point of view and you were given the job, as you have been given the job, of finding areas and locations where industry might be safely located, where there would be metals, raw resources of all kinds in rich abundance, where there was opportunity to develop hydroelectric power and a place that would be comparatively safe compared to other sections of the United States, would it not be your duty to work out a program that would put to use areas such as I have just described?

Mr. PETERSON. I would like to see such areas utilized to the maximum for reasons I indicated.

Senator WATKINS. Is it not part of your job to find such places?

Mr. PETERSON. It is part of my job in a broad sense and more particularly in a limited sense it is the responsibility of Dr. Flemming of ODM. It is a joint responsibility.

Senator WATKINS. You have a joint responsibility and as I understand it, if that is not already in the written definition of your job, I am going to do my best to see that it is written in there, not only you, but Dr. Flemming, that they do find places in this country.

You can find another place in the United States where we could have our Ural industry line, as Russia has found in her country. You know the country pretty well.

Mr. PETERSON. I think it would be very difficult, Senator Watkins.

Senator WATKINS. I think it is generally admitted it is one of the best areas for the purpose I just mentioned.

Mr. PETERSON. I would like to say, Mr. Chairman, if I may, on a purely personal basis, I find myself in a rather amusing situation as one who probably has spoken as often and as enthusiastically for development of resources in America as anyone, to be limiting my comments here as much as I am this morning.

But I think I am pursuing the proper course.

Senator WATKINS. We understand that you are limiting your testimony to the defense program and to the requirements of the defense program and the possibilities of this project under that program.

As you very fairly said, you do not want to discuss the engineering and the legal questions involved in the controversy that has arisen between California and the individual States.

But we want to get a clear-cut statement in the record as to what your limitations were and how far they went and actually what would

be the effect of your testimony with respect to the civil-defense program in this country.

Mr. PETERSON. Yes, sir.

Mr. KUCHEL. I would like to have this record clear, too. I would first like to say that I am a junior Senator. I defer to everyone around the table.

Senator O'MAHONEY. I am junior to you. I have just been elected.

Senator KUCHEL. I will acknowledge that you are my senior and I have great respect for the chairman.

I would like to have the record show that when he used the word "trap," there was a smile on the genial chairman's face.

Now, this is important to have your testimony crystal clear. I do not want to abuse what you have said, but I do not want the record abused, either.

You have said that you did not want to discuss S. 500 on the merits and I congratulate you for it because it is a technical problem. You have indicated that the requirements of the defense program bring you here. You have indicated that the features or some features of the project lend themselves to the survival of the United States in time of war. What are those features?

Mr. PETERSON. It is essential in my judgment, if this country is to survive, that as much of its industrial resources as possible be placed in the most secure locations.

In other words, that some of them be underground, and that as many of them as possible be dispersed over a wide area.

Certainly the mountainous area that is involved in this development would lend itself very nicely in both of those respects.

In addition to that, one aspect of dispersion is just to create more targets. The more targets there are, the more they are scattered over the countryside, the more difficult it is for the enemy.

Senator KUCHEL. And you do not confine your interest to this specific geographical area, but your interest runs likewise over the whole breadth and length of this country.

Mr. PETERSON. Absolutely. I am interested in this one because it is momentarily up for consideration for development.

Senator KUCHEL. When you say you will not discuss the measure on its merits, you do not mean merely the question of engineering or legal ones that are involved, do you?

Mr. PETERSON. If this project is sound engineeringwise, which in turn would make it sound economically, if this project has the possibilities of paying out—of course, I have that in mind——

Senator KUCHEL. Let me put it this way, Governor: You make no comment on the feasibility of this piece of legislation, do you?

Mr. PETERSON. No; I do not.

Senator KUCHEL. You make no comment on the economics justification of it?

Mr. PETERSON. I do not.

Senator KUCHEL. You make no comment on the legality involved?

Mr. PETERSON. I do not.

Senator KUCHEL. Nor of the engineering problems that are raised?

Mr. PETERSON. I do not. Those matters are all in the hands of people in the Government who are expert in those fields and who have that responsibility. That is not presently my responsibility.

I am interested in the defense aspects, the civil-defense aspects of this legislation.

Senator KUCHEL. And what are those civil-defense aspects?

Mr. PETERSON. As a citizen I may have ideas as to the merits of all these things of which we are speaking and possibly on the basis of somewhat broader experience than most citizens are privileged to have.

Senator KUCHEL. And the civil-defense aspects in this legislation, Governor, are what? Merely the development or the proposed development of another geographical area in the country?

Mr. PETERSON. This development, if carried through, falls into a pattern that in my judgment is very necessary for the survival of the United States.

Senator KUCHEL. Because of the recommended dispersal?

Mr. PETERSON. Because of dispersal. I would even go further than that, however, Senator Kuchel.

I would say that this country needs all the power that can be developed.

This country needs, in my judgment, from a defense standpoint, all of the irrigable land that can be developed.

This country needs the maximum development of the resources of the United States, be they coal, be they oil, be they uranium, be they whatever is to be found anywhere in the United States.

Senator KUCHEL. I completely agree with you. There is a right way of doing it, I suppose, and a wrong way of doing it.

You make no comment on whether S. 500 is the right way or the wrong way; is that not correct?

Mr. PETERSON. I say that S. 500, assuming that it meets all of the requirements of good commonsense, that it does no violation to basic law, then this development lends itself materially to the security of the United States.

Senator KUCHEL. And if your assumption on any one of them were wrong, then your answer would be contrary, would it not?

Mr. PETERSON. Not necessarily.

However, I would not want to be a party to breaching fundamental law any time in the United States, but that is a matter that does not rest within my purview today.

Senator KUCHEL. The only reason I am so interested in this, and I do not want to take the committee's time nor your time, I do not want anyone placed in a position where if he were inclined finally to oppose a piece of legislation that he would be subjected to criticism, that the Office of Civil Defense said his vote could be translated into a vote against civil defense in this country. I am sure you would not want to leave that with this committee, Governor.

Mr. PETERSON. I would not want to do that. I do not believe any member of the committee, or the Senate, would want to do it.

Senator KUCHEL. And you do not do it in your testimony?

Mr. PETERSON. No; I do not.

Senator BARRETT. I am very much impressed with your statement, Governor Peterson. I would like to ask you one question.

If this project would develop 1,600,000 kilowatts of power when the project was completed and if you took into consideration the fact that the United States Geological Survey estimates there are 600 billion tons of coal in this area—with every county in the State of Wyoming underlaid with coal, we have a large proportion of that

600 billion tons in that State—and if we have the water available and consequently if we are able to firm up this electric power that would be produced on the project, would not this area be an ideal spot for the dispersal of vital industries of this country?

Mr. PETERSON. In my judgment, yes. That, of course, is what I indicated in my statement, sir.

Senator BARRETT. There is one other thing I would like to ask you about, Governor Peterson.

As I indicated to you before the hearing, I am very much surprised at the fact that we are lagging so far behind other countries in dispersal of strategic industries. As I take it from your statement here this morning, a good many of the European countries have made remarkable progress in that respect, but that we have done very little in this country. Is that right?

Mr. PETERSON. That is correct. At least I would like to modify it just a little, Senator Barrett.

The Scandinavian countries and Switzerland, have done and are doing a remarkable job.

Senator BARRETT. Russia has done a good job.

Mr. PETERSON. Russia has done a job which I am not quite so familiar.

Senator BARRETT. Nobody else in this country, either, I must say.

Mr. PETERSON. It is true that real progress is being made in those areas.

Senator BARRETT. Would you say that the difficulty in this country is because we do not have proper legislation to encourage the dispersal of vital industries into the interior of our country?

Mr. PETERSON. I do not know that that is the major factor. I think that certainly is one very important one; yes, sir.

I am inclined to think that a more important factor has been that Americans just find it difficult to believe that an enemy has the capabilities of flying aircraft to the United States and dropping these tremendously destructive weapons on our cities. We find it difficult to accept that.

Then we make the mistake, to, of blowing hot and cold. One day we think there is going to be peace, and the next day we think there is going to be war, and we react accordingly.

We find it difficult to hit a middle position and constantly work to maintain a degree of alertness and readiness.

I think that is all an indication of very natural tendencies. I am not very critical of the people for that attitude, but it could lead to disaster in this country.

Senator BARRETT. I think we will find out most of these facts when we hold a post mortem.

Mr. PETERSON. I hope we don't, but there is some possibility of that. I hope we don't.

Senator BARRETT. Is there any reason you know of why we should lag behind the rest of the world in making this change in our policy?

Mr. PETERSON. No. I would think there would be every reason why we should lead the world if we can just make the psychological adjustment necessary to recognize the danger we face.

I think there is evidence that we are making progress, too. But not anywhere near rapidly enough.

Senator BARRETT. As I told you before the hearing this morning, I have made somewhat of a study of that because I thought we ought to have more liberal legislation along that line to encourage dispersal of industries. I am preparing the introduction of a bill before long, but my information is that we have made little or no headway in that regard.

I am rather astounded to find that that is the case.

Now, I did not quite agree with the statement you made earlier that you would not favor the dispersal of vital industries that were not well located. It seems to me that if they were at a point where they would be susceptible of bombing that perhaps the ODM ought to give consideration to encouraging relocation of those industries regardless of the fact that they have been historically located at those points.

Mr. PETERSON. That may be true, Senator; undoubtedly it is true with respect to certain very vital installations.

As a generality, I am sure you would agree with me it would be better to locate the plants that result from expansion in secure places rather than disrupt the economy and the tax basis in the cities where these places are.

Senator BARRETT. I would agree with that, and I would ask when it comes to the point when they have to rehabilitate their plants, to install new machinery, that it may be the best time to decide to relocate, but generally speaking, I agree.

Mr. PETERSON. I was trying to approach it from a rather conservative viewpoint.

Senator BARRETT. I think you have made a very fine statement. I congratulate you.

Mr. PETERSON. Thank you.

Senator GOLDWATER. I am interested in your comments on relocation. Do you realize that the Colorado River basin comprises one-twelfth of the whole United States in land area?

Mr. PETERSON. Yes. That would seem natural to me.

Senator GOLDWATER. If this area is to be used for dispersal purposes, if Wyoming is to develop her coal resources, if Utah and Colorado are to develop their mineral resources, including uranium and if Arizona and Nevada——

Senator O'MAHONEY. We have uranium, too.

Senator GOLDWATER. We have, too, but we do not compare with Colorado and Utah in production. We in Arizona also have a large coal reserve.

If this is to be utilized then we must develop this area. If we are going to use one-twelfth of the United States for dispersal, we have to develop the power and resources. Is that not true?

Mr. PETERSON. Absolutely.

Senator GOLDWATER. Then you are discussing the merits of this legislation because certainly one of the merits would be the recognition of the fact that here is one-twelfth of the United States waiting for dispersal, waiting and begging for industry to come into this remote area, and needing only power development.

Mr. PETERSON. Senator, that might be true in a broader sense, but I think for reasons that you would respect, I have attempted to limit my appearance here to the defense considerations.

Senator GOLDWATER. I did not want the record to infer that the recognition of the value of this great area for dispersal purposes did not have merit.

Mr. PETERSON. I certainly did not suggest that.

Senator GOLDWATER. I know that you did not, but my friend from California might by his remarks have left some question about it.

Senator KUCHEL. I do not want the record cluttered, but, Senator O'Mahoney, I am surprised at you. You warned the witness about being trapped when it is the poor little fellow over here, but when your friend from Arizona is kind of getting the record over on his side, there is no warning.

I am surprised at you.

Senator O'MAHONEY. The Senator from Arizona has not had the pleasure of listening to your examination of the witness. I had to give him some leeway.

Mr. PETERSON. I don't believe the record, if I may say so, will indicate any entrapment.

Senator GOLDWATER. To wind this discussion up regarding the value of this area for dispersal, last Saturday I visited with the Continental Air Command Headquarters in Colorado Springs. While there, we discussed the target areas which are not restricted and are generally known by the people of the country and those general areas are the northeastern part of the United States and the northwestern part of the United States and souhern California.

I asked this question of General Smith, who is vice commander, who was briefing me in the absence of General Chidlaw: Would it not help your defense capabilities if these targets were dispersed?

His answer was a definite "Yes," that the more targets Russia had to seek out, the easier it would be for us to intercept and the harder it would be for them to locate.

Now, I might make one other statement——

Senator KUCHEL. Are you suggesting by indirection that the Department of Defense is now in a position to urge the adoption of S. 500?

Senator GOLDWATER. No, Senator. I say that I hope they can see their way to do that. In fact, I think if they were speaking with all candor and wisdom which I know they possess, that they would approve not only this project, but the central Arizona project when that comes before us.

I would like to point out in closing, because this is an interesting thing that the Senator from Wyoming has brought up, the fact that Russia has done just exactly what the Senator from Wyoming has suggested we do. They have gone into underdeveloped areas and developed those areas.

Now, their great expanse along northern Siberia and the central part of Siberia, which have great rivers which flow almost the year around, have been developed.

That is where dispersal has gone.

While it is true it is shorter in range for our bombers, nevertheless, there are more and more targets developing.

I suggest that in following what Senator Barrett of Wyoming has so wisely said, that we should consider the importance of the upper

basin and the lower basin development for the defense purposes of the United States.

I think you have made a very admirable and splendid presentation on behalf of that.

Senator WATKINS. I have only 1 or 2 questions.

Governor, as I recall—you probably can advise me if this is so—in World War II one of our large aircraft factories in the Northwest sought another site to build a supplemental plant in the Midwest, to get it off the coast; is not that right?

Mr. PETERSON. I am not familiar with the details of the matter, Senator Watkins. The fact is they did establish a new site at Wichita, Kans.

Senator WATKINS. That was the Boeing factory in Seattle?

Mr. PETERSON. Yes.

Senator WATKINS. You also know that in World War II that considerable numbers of people moved from the coast to the interior, from the west coast to the interior.

Mr. PETERSON. That is right.

Senator WATKINS. That is at the time when the lone Japanese submarine came along and with a pop gun fired at some of the places up and down the line, did not have any atomic bombs, did not have any modern weapons at all.

We can imagine what would happen if a submarine showed up on the coast with real atomic bombs or with atomic weapons, hydrogen weapons of some kind or other.

There is always a bare possibility in a situation of this kind.

Mr. PETERSON. I think there would be quite an exodus.

Senator KUCHEL. For the few of us who remain you would at least want to grant them a reasonable guarantee of water supply, would you not?

Mr. PETERSON. Yes, sir.

Senator O'MAHONEY. Are there any other questions?

There being no other questions, Governor Peterson, the committee expresses its deep appreciation for your contribution.

STATEMENT BY JOHN GROUNDS

Mr. PETERSON. Thank you very much. Thank you, Mr. Chairman.

Senator GOLDWATER. Mr. Chairman, I have received a very interesting communication from a very prominent cattle rancher of Arizona who spent much of his youth in and around what is now the Dinosaur National Monument. John Grounds is the author of this paper. I would like to have it inserted in the record.

Senator O'MAHONEY. It may be included.

(The document referred to is as follows:)

DINOSAUR NATIONAL MONUMENT (ON THE GROUND)

In the past 2 years we have heard and read many angles and slants on the Dinosaur National Monument versus the Echo Park Dam site.

Many of the assertions and versions of the writers are erroneous or misinterpretations of what others have said.

It is impossible for anyone to realize how inaccessible this area really is until they have been on the ground.

There is about 52 miles of river canyon within the monument and I have seen most of it many times due to occupational duties. My father was among

the old-time cattlemen who owned huge cattle empires. At times cattle in his possession exceeded 20,000 head. His cattle grazed to the canyon bluffs throughout most of the monument area.

Many of the more beautiful canyon sights can be seen only after hard rides on horseback.

There is a road from U. S. 40 leading north over Blue Mountain and down Pool Creek to Pat's Hole. From this point one can see the Steamboat Rock and the river junction of the Green and Yampa Rivers.

There is another road leading in from the Colorado State Highway 318 to the northern end of the monument. The nearest towns on this side are Rock Springs, Wyo., and Maybell, Colo. This north road leads into the entrance of one of the most beautiful of all canyons, the Lodore. This road was built by the Lodore Canyon Tourist Camps in 1936 and terminated at a boat landing. A boat line was maintained by the tourist camp. Passengers were carried by boat 3 miles down betwen crimson walls of the Lodore to another established camp accessible only by boats.

I mention the tourist camp and the boat line as there is indeed much significance between the two items.

In many cases wars are declared and battles fought with few people knowing just why or where they actually started.

It was at this point that the enlarging of the Dinosaur National Monument first began taking shape.

The tourist camp, in an effort to get better advertising, began searching for possibilities to have the canyon country set aside in a national park. They worked with members of the Lions Clubs of Vernal, Utah, and Craig, Colo., to get the Park Service interested. They also engaged one of the foremost specialists of canyon photography and photographed points of interest throughout the entire canyon stretches.

Eventually, officials from the Park Service came to investigate. They decided much redtape could be sidestepped by enlarging the Dinosaur National Monument rather than to organize a whole new setup for a national park.

In 1938 the enlargement of the monument became a reality. The original 80-acre plot set aside in 1915 by Woodrow Wilson was increased to 200,000 acres.

Now let us glance at the situation from the viewpoint of the Department of the Interior and the Bureau of Reclamation.

Back at about the turn of the century the Department of the Interior was spending time and money in search of a dam site in these canyons. I have never seen records of this work on paper, but can explain what anyone else can still see on the ground.

On arriving at the entrance of the Lodore Canyon there is a very noticeable straight line on the east side of the entrance running from a high ridge down to the river level. This is an old road built by the Government to get their machinery into the canyon. The road is too steep for automobiles. It leads to a little meadow right where the river enters the canyon walls. At the lower edge of the meadow there is a long rock foundation, apparently a cook shack, and numerous other foundations of smaller buildings. Only cellars are left intact. The surface structures have long since been swept away by ice jams and floodwaters.

On downstream along the canyon walls, accessible only by boat, are the locations, painted on the canyon walls in black paint, of test holes. These holes were drilled from a barge into the river floor testing for the depth to bed rock. The location markings are numbered from 1 to 10 and located down the canyon for several miles. At one location are the words "unfinished hole." This work was apparently no small operation for that day and age and probably required several years.

This canyon area and the land up river within the intended lakebed was drawn from the Homestead Act and placed under the Bureau of Reclamation. However, prior to this withdrawal, most of the land of any value had already been homesteaded, as Brown's Park was considered a fine winter country as compared to the high mountain country around it.

Most of the settlers located their land on the river bottoms or overflow land. Improvements on this land were at the mercy of the unpredictable Green River in the summertime. The high water stage could usually be expected from about June 20 until July 1. In the wintertime the river took its toll of livestock along steep frozen banks and airholes in the ice. In the spring of the year local floodwater caused quicksand, one of the greatest river hazards to livestock. These drawbacks are not in Brown's Park alone but found more or less along all uncontrolled rivers.

It was only a matter of a few years until most of the homesteads were owned by a few large operators.

In the event that the Echo Park Dam is to be constructed, the Government will not have too much land and few owners to reckon with as compared with some sites.

It seems that the Department of the Interior has drawn its heaviest fire from conservationists denouncing the Department for suggesting the construction of a dam on Park Service land. If these people and the public knew and understood the truth about this matter, it would be no longer an issue. When the Park Service began outlining the intended monument boundaries they first had to obtain ground from the Department of the Interior which was still under the Reclamation Act for future dam sites.

The Interior Department was very cooperative and gladly released the land to the Park Service, with a provision: All power and dam sites reserved to the Bureau of Reclamation.

We have two proven businessmen, Secretary McKay and Under Secretary Tudor (who has recently returned to private business). Are writers going to continue heaping abuse on the shoulders of these two men for the location of this dam site?

We have a point that is being asked by thousands of people. Why should the Government enter into direct competition with private enterprise? No one believes more wholeheartedly in private enterprise than I do, but we have to establish a boundary between Government business and private enterprise when a conflict arises. If a private company builds this dam, hydroelectric power is about all they have to sell. They will probably operate to a higher peak of efficiency than the same Government staff, but they will not be able to foot the bill for at least 2 or possibly 3 generations as the dam will be out of proportion to their needs.

If the Government builds the dam, the tax dollars will be reimbursed to the extent of hydroelectric power (which will be sold to private distributors) plus the benefits that will be reaped by thousands of taxpayers who live on controlled river ranches and farms, plus thousands more taxpayers living on highways and roads with businesses and establishments that will prosper for generation to come by the influx of tourist traffic to visit a great dam in a beautiful monument.

Still another plus, irrigation water for many areas and water to allow expansion of cities. These items that are plus the generated power and numerous other phases of human life benefited by the dam are clear-cut evidence that the Echo Park and other dam sites of the upper basin plan are national improvements to benefit taxpayers throughout the land.

These inland projects are also defense measures in case of war.

Writers opposing the upper basin projects usually elaborate on the cost to the taxpayers of $909,339,300, or roughly $1 billion spent and gone. At any rate, this money is to be spent in our own country for our own labor and material and will be distributed over a period of about 30 years to complete the upper basin project.

If the estimates are correct on our growing population, that by 1975 our census will exceed 200 million people within the United States, we had better not allow the upper river project plan to slide into many more pigeonholes. After the completion of the entire project, the upper basin States will not be able to attain maximum stages of development for 50 to 75 years; so time is wasting if we intend to stand on our own feet with the ever-enlarging figures of our future needs.

We have the Colorado River compact drawn up in 1922 allotting each State its share of the river water. None of the States, according to the compact, shall gain a right by usage of another State's water, thus allowing the States to bide their time for developing water use.

The river line between the upper and lower basins is at Lees Ferry.

In the compact the average flow of the Colorado River at Lees Ferry was decided to be 15 million acre-feet of water per year.

The upper basin is to deliver below Lees Ferry 7½ million acre-feet of water per year.

The fluctuation of the river is enormous. During drought years, it is calculated at less than 5 million acre-feet flow per year. Deep-snow years in the upper basin States will cause a year's flow to reach 25 million acre-feet of water past Lees Ferry.

These figures are proof that the lower basin would have a much greater dependable amount of water if the upper basin project plan was carried out. The present figures show about 60 percent of the Colorado River water flowing into the Gulf of California unused.

To sum up the "law of the river" (Colorado River compact), things look well enough on the surface. Nothing of serious consequence has turned up to suggest defeat or loss of rights to the upper basin States within the life of the "law of the river," a span of 33 years. But now let us remember the fact that 3 dams are completed in the lower basin and development is at hand.

If the lower basin has time to develop to their capacity of allotted water, then proceed beyond that quota—which would be the natural thing to do if there was a surplus of water—then with their possession and prior usage of the excess water, any law contrary to this action would be of little value to the upper basin States.

To say that any State would overstep its share is only a suggestion. We are badly in need of a suggestion of some type to fill in a gap. The gap is this: I have received a number of letters from various committees, and citations telling me to write my Senators and Representatives to block the upper river basin project. They generally support two main reasons: one, "Our taxes will be raised"; and, two, "California may not get her rightful share of Colorado River water."

These letters and pamphlets under different headings probably point to one central organization and merely a shrewd scheme to get people to act when they see so many groups all thinking alike. Anyone contemplating action after receiving literature of this nature should do some studying for himself. The mentioned literature does not necessarily indicate that the State of California is backing up this maneuver, but the said maneuver may create a damaging effect on legislation in favor of the upper basin project.

Senator O'Mahoney of Wyoming recently wrote a very accurate article on the Echo Park project.

A great amount of accurate information is released on the back of an excellent map of the Dinosaur National Monument. This map has been obtained at a very reasonable price at the United States Department of the Interior, Geological Survey, Denver Federal Center, Denver, Colo.

There is very little firsthand information on all the Yampa and Green River Canyon. To see the sights from the top of the canyon walls one must go through many hardships and spend much time and money. To see the canyons from the rivers, one goes through the hardships of making portages around dangerous rapids and being wet continuously. Some say that the Yampa River is easy to run in a boat. That I do not know. I will say that "easy" is not the case on Green River. The fall of the river, the volume of water, and the size and number of boulders are too great for a boat on its own. At one point in the Lodore Canyon, at low-water stage, almost the entire river current goes under the west wall.

The Lodore Canyon received its name from Robert Southey's Cataract of Lodore, and very befitting it is.

Until the Echo Park Dam quiets the rushing, roaring, white waters of the canyons of Yampa de Lodore, it will mean nothing to tourists and sight-seeking joyriders who have little time to spend in one place.

Senator ANDERSON. Mr. Barlow.

Senator BARRETT. Might I say that the next witness here is Mr. Norman Barlow, from our State of Wyoming. He is the vice president of our State senate and a member of the senate for the past 6 years. Then he was in the house for a number of years before that.

He is one of our compact commissioners in the upper Colorado River Basin. He is presently acting as a commissioner for Wyoming.

In addition to that, he is one of the leading citizens of our State and the president of the Green River Basin Development Commission.

In order to save time I understand that he would be glad to file his statement for the record and submit to questions.

Senator ANDERSON. It is a good short statement. Why do you not go ahead and read it, Mr. Barlow? It will not take too much time.

STATEMENT OF NORMAN W. BARLOW, ACTING COMMISSIONER FOR WYOMING, UPPER COLORADO RIVER COMMISSION

Mr. BARLOW. Wyoming is in complete accord with the policy of the Department of the Interior for the planned development of the water resources in the upper Colorado River Basin.

Under the provisions of the upper Colorado River Basin compact of 1948, Wyoming was allocated 14 percent of the share eligible to the upper division of the Colorado River under the terms of the 1922 compact, which, reflected in acre-feet, totals of 1,043,000 yearly over a 10-year continuing period.

The present consumptive use of water or streamflow depletion by Wyoming water users in the Colorado River Basin in Wyoming presently is 258,400 acre-feet per year. This annual use includes all irrigation uses, reservoir losses, and municipal and industrial uses. This leaves 795,000 acre-feet per year for new uses.

If Wyoming is to be able to develop its potential irrigable lands, holdover storage such as is contemplated in Glen Canyon and Echo Park Reservoirs will be necessary. The participating projects included in S. 500 located in Wyoming are the Lyman, LaBarge, and Seedskadee projects. The Lyman will furnish supplemental water to 40,600 acres. The LaBarge project will irrigate 7,670 acres of new land and will provide supplemental water to 300 acres. The Seedskadee project will irrigate 60,720 acres of new land. The Eden project, which is now under construction, thanks to our Senator O'Mahoney, would also be included as a participating project from the standpoint of utilization of power revenues to aid irrigation cost repayment. Wyoming's total water use per year, if these projects were complete, would be approximately 372,000 acre-feet or only about 37 percent of the water allocated to Wyoming under the 1922 Colorado River compact and the 1948 upper Colorado River Basin compact.

Wyoming also has another fine project; namely, the Sublette project, that will provide water for 72,000 acres of undeveloped lands and supplemental water for 12,000 acres presently irrigated with an inadequate water supply. The lands included in this project are situated in the upper Green River Basin, Sublette County, Wyo., along the Green and New Fork Rivers and their tributaries.

The Sublette project includes 4 reservoirs, a 2,200-kilowatt powerplant, 2 main distributing canals, a lateral system, and a drainage system. The potential reservoirs are: Kendall, Freemont Lake, Burnt Lake, and Boulder Lake, with capacity of 162,000, 64,000, 30,000, and 165,000 acre-feet, respectively. The Bonneville Canal would distribute water to lands lying along the east side to Pine Creek and Big Sandy, and the West Side Canal would serve lands along the west side of the upper Green River Basin between Kendall Reservoir and South Piney Creek. Storage regulation for lands on the west side of the basin would be provided in the potential Freemont Lake, Burnt Lake, and Boulder Lake Reservoirs.

The 33d State Legislature of the State of Wyoming passed senate joint memorial No. 2 memorializing the Congress of the United States to enact legislation authorizing the Colorado River storage project and participating projects. I am presenting this official act under the great seal of the State of Wyoming for the record. We, in Wyoming,

are doing everything we can unitedly to get this much-needed development, and we urge early enactment of S. 500.

(The document referred to follows:)

STATE OF WYOMING, OFFICE OF THE SECRETARY OF STATE

UNITED STATES OF AMERICA,
State of Wyoming, ss:

I, EVERETT T. COPENHAVER, secretary of the State of Wyoming, do hereby certify that the annexed is a full, true, and correct copy of Enrolled Joint Memorial No. 4, Senate, being Original Senate Joint Memorial No. 2, as passed by the Thirty-third Legislature of the State of Wyoming, and approved by the Governor on February 10, 1955, at 8:15 o'clock a. m.

In testimony whereof, I have hereunto set my hand and affixed the Great Seal of the State of Wyoming.

Done at Cheyenne, the Capital, this twenty-fourth day of February A. D. 1955.

[SEAL]

EVERETT T. COPENHAVER,
Secretary of State.

[Original senate joint memorial No. 2]

ENROLLED JOINT MEMORIAL NO. 4, SENATE, 33D STATE LEGISLATURE OF THE STATE OF WYOMING

A JOINT MEMORIAL Memorializing the Congress of the United States of America with reference to proceeding with the development of the Colorado River in the upper basin States by authorizing the Colorado River storage project and participating projects

Whereas the development of the Colorado River in the upper basin States, consisting of Arizona, Colorado, New Mexico, Utah, and Wyoming, is of foremost importance to the future development and general welfare of said States and of the Western United States, and

Whereas the allocation of the waters of the Colorado River apportioned to the upper basin by the Colorado River compact has been amicably settled by and between the above States, and

Whereas the Upper Colorado River Compact Commission, comprising one member each from the States of Colorado, New Mexico, Utah, and Wyoming and the Federal Government is a functioning body and has already completed a dynamic plan for the development of the project, and

Whereas a report of the participating projects has been compiled by the United States Bureau of Reclamation, approved, with modifications, by the Secretary of the Interior, and submitted by him to the Congress of the United States, and

Whereas this desirable development cannot be commenced without the authorization of the Congress of the United States of America: Now, therefore, be it

Resolved by the Senate of the 33d Legislature of the State of Wyoming, the House of Representatives of such legislature concurring, That the Congress of the United States of America, be and it is hereby memorialized to promptly, diligently and fairly consider and act upon at this session, legislation to authorize the Colorado River storage project and participating projects, and be it further

Resolved, That certified copies hereof be promptly transmitted to the President and Vice President of the United States, the Speaker of the House of Representatives of said Congress, United States Senator Frank A. Barrett, United States Senator Joseph C. O'Mahoney, and Representative in Congress E. Keith Thomson, to the Secretary of the Interior, the Commissioner of Reclamation, the Upper Colorado River Compact Commission, and to the governors and legislatures of the following States: Arizona, Colorado, New Mexico, and Utah.

R. L. GREENE,
President of the Senate.
T. C. DANIELS,
Speaker of the House.

Approved February 10, 1955, 8:15 a. m.:

MILWARD L. SIMPSON,
Governor.

Senator ANDERSON. Thank you, Mr. Barlow. That is a model of a compact and brief statement in presenting the position of your State.

Now, with reference to the Sublette project, in case the Sublette

project were built at a subsequent date, would that exceed the amount of water allotted to Wyoming? You still would be greatly deficient in the use of water?

Mr. BARLOW. If that Sublette project were built, it would increase the percent as shown in my statement of some 12 percent, still leaving about 52 percent eligible for Wyoming and not included in any legislation.

Senator ANDERSON. Therefore we are not trying to use all the water in the river in any of these projects; are we?

Mr. BARLOW. No. Wyoming does not propose to and there is no legislation at the present time.

That is only going to consume a small part of the water eligible for use under the compact as constructed.

Senator BARRETT. I might ask Mr. Barlow this question at this point:

As I understand from your statement, we are presently using 258,000 acre-feet of water. If all of the projects that are authorized in this legislation were constructed, we would use 372,000 acre-feet, which makes a total of 630,000 acre-feet.

Then, as I understand from Mr. Budge, who is sitting beside me here, the Sublette project would take 138,000 acre-feet of water which would make a grand total of 768,000 acre-feet, which would be only about two-thirds of the 1,043,000 acre-feet of water allocated under the upper Colorado River project; is that right?

Mr. BARLOW. Senator, that is not exactly correct in that the reflected amount of use in Wyoming, with the proposed legislation, will only be 528,500 acre-feet of water.

Under the compacts we are entitled to 1,043,000.

Senator BARRETT. You say here on page 2, if these projects were completed it would be approximately 372,000 acre-feet of water.

Mr. BARLOW. That is using present water rights not included in the compact.

Senator BARRETT. And in addition to that the water that is authorized in this bill?

Mr. BARLOW. That is correct.

Senator BARRETT. So the total, then, would be something around 600,000 acre-feet.

Mr. BARLOW. About 600,000 acre-feet with the Sublette project.

As the Senator knows, and the chairman knows, the Sublette project is a very eligible project and it was agreed by the Upper Colorado River Commission that there would be no priority in eligible projects.

Therefore, it is included in the statement from Wyoming along with the statement that was given yesterday by Governor Johnson, of Colorado.

Senator BARRETT. Your computations are on the basis that the upper States will receive 7½ million acre-feet a year?

Mr. BARLOW. Yes.

Senator BARRETT. If we were to receive but 6½ million acre-feet per year we would still be well below the allocation to Wyoming; is that right?

Mr. BARLOW. As I understand the present legislation and the amendments, if they are accepted by the committee and by the Senate, they would only be consuming approximately 4 million acre-feet of water of the 7½ million now eligible for the upper basin.

Senator BARRETT. The point I was asking, Mr. Barlow, if the total amount that is available for the upper basin is 6½ million, it would be 768,000 feet of water after the deductions for present use are made, so that in any event we would not begin to consume the water that would be allocated to the State of Wyoming in that event.

Mr. BARLOW. I might say, Senator, that using the low period of 1931 to 1940, Wyoming still would have 364,700 acre-feet of water eligible for use not proposed in any legislation at this time.

Senator BARRETT. It would take a long period of time before they could use that because of the project to be constructed.

Mr. BARLOW. That is right.

Senator BARRETT. What interest, if any, does our State have in the Green Canyon project as far as irrigation is concerned?

Mr. BARLOW. Of course, as you know, Green Canyon is probably the most important irrigation reservoir we have as far as agriculture is concerned, because we are going to be able to irrigate arid areas in the upper reaches of the stream for agricultural purposes that we could not do if we didn't have Green Canyon constructed.

It is probably the most important agricultural reservoir we have.

Senator BARRETT. Assuming we have Green Canyon constructed, then we can use the water for consumptive uses in our State.

Mr. BARLOW. That is correct.

Senator BARRETT. You are following Mr. Curry Jenkins, former member of our State senate?

Mr. BARLOW. Yes.

Senator BARRETT. Was he one of the assistant commissioners in the Santa Fe hearings?

Mr. BARLOW. He was one of the assistant commissioners.

Senator BARRETT. Frank Emerson, who was then State engineer, was commissioner?

Mr. BARLOW. He was commissioner for Wyoming.

Senator BARRETT. Later he was governor?

Mr. BARLOW. That is right.

Senator BARRETT. Your father-in-law attended the hearings in Santa Fe?

Mr. BARLOW. That is true.

Senator BARRETT. Have you talked to him about the negotiations that took place at that time?

Mr. BARLOW. That is part of his religion. He has lived it for 50 years.

Senator BARRETT. You heard the discussion yesterday with Governor Johnson with reference to the possible benefits that Wyoming and the upper States would get under the 1922 compact. I should like to ask you this:

Assuming that Wyoming was entitled under the laws of our State and by comity from all the other States in the basin to the right to use 258,000 acre-feet of water at the time the compact was negotiated, and that we are still entitled to use that water because the water rights were established long before the compact, does it seem reasonable to you that Frank Emerson as our State engineer and your father-in-law as an experienced man in the water law and irrigation, would be so naive as to go down to the city of Santa Fe and participate in the negotiations and bring back to Wyoming a compact that guaranteed to them only the water that they had long before the compact?

Mr. BARLOW. Senator, I think the terms of the compact are understood by everyone. They were surely understood by the commissioners for Wyoming and it was agreed in the original premise that existing rights would not be disturbed by this compact.

I am quite certain that is now the philosophy that is used by the department and those that are processing this compact at the present time.

Senator BARRETT. There is no question about that. What I asked you was: Would they be so foolish as to come back from Santa Fe with that advantage and that advantage alone which they already had?

Mr. BARLOW. Well, of course, they would not. They couldn't have gotten back to Wyoming.

Senator BARRETT. Thank you very much.

Senator ANDERSON. Senator Watkins?

Senator WATKINS. I have no questions.

Senator ANDERSON. Senator O'Mahoney?

Senator O'MAHONEY. Mr. Barlow, when Governor Johnson testified yesterday, he referred to the Sublette project in two units, the Elkhorn and the Kendall.

Would you, for the record, describe those as separate units because that does not appear as yet in the record?

Mr. Larson testified with respect to Sublette as including both and your testimony does, too.

Mr. BARLOW. Senator, for the benefit of the record, the Elkhorn project is one of the projects included in the Sublette project.

Likewise Kendall project is also one of the projects in the Sublette project. They are two separate projects within the Sublette project.

So that when we are talking about Elkhorn and talking about Kendall, we are talking about a good part of the Sublette project. They are included and they are documented as such by the Bureau of Reclamation.

Senator O'MAHONEY. You speak of four potential reservoirs. How many of them are in Elkhorn and how many of them are in Kendall?

Mr. BARLOW. Of the four reservoirs, the Kendall Reservoir would be listed as such, and would take care of the west side canal that is proposed to firm up all the small streams on the west side in the upper end of the basin.

The three reservoirs, Freemont Lake, Burnt Lake, and Boulder Lake, would take care of the east side canal division and distribution for the Elkhorn project.

Senator O'MAHONEY. Thank you very much. I thought that ought to be in the record.

Senator ANDERSON. Are there any other questions of the witness?

If there are no other questions, we thank you very much, Mr. Barlow.

The next statement will be Mr. Clyde.

Will you state your name for the record, and the position that you hold?

STATEMENT OF GEORGE D. CLYDE, CIVIL ENGINEER, AND COMMISSIONER OF INTERSTATE STREAMS FOR UTAH

Mr. CLYDE. My name is George D. Clyde. I am civil engineer and commissioner of interstate streams for Utah, and appear here as a representative of the State of Utah to present a brief statement relative to the Upper Colorado River storage project.

Senator WATKINS. I think, Mr. Chairman, Mr. Clyde should also tell what experience he has had in the field of irrigation research and work over the years for the Department of Agriculture.

Senator ANDERSON. I will be happy to have him do that. I know how long his experience is. It is 20 minutes to 12 now. If he told it all we would be here until 12 o'clock.

You may summarize it.

Mr. CLYDE. Thank you.

I have spent more than 30 years in the field of irrigation engineering, and during that experience I have covered the 17 Western States and I am familiar with the irrigation problems not only in those States, but in the entire United States.

I am familiar with the water-supply situation in most of the major streams, the water characteristics on those streams.

For 8 years I was in charge of the irrigation research work for the Department of Agriculture in the 17 Western States and I am now the director of the Utah Water and Power Board representing the State of Utah on its water matters.

Senator ANDERSON. That is a fine experience with which many of us are familiar. I know that you can take a day to tell us some of the things you have encountered in that work. We are very happy to have you here.

Mr. CLYDE. The Colorado River storage project and participating projects as set forth in S. 500, have been developed in full conformity with the Colorado River compact and the upper Colorado River compact and its construction is necessary to make possible the initial beneficial consumptive uses of that portion of the waters allocated to the upper basin States by the Colorado River compact.

The Colorado River fluctuates widely from year to year and season to season. Its full utilization is dependent upon control and regulation. Only by such control and regulation in both the upper and lower basins can the terms of the compact be met.

The construction of the Hoover, Davis, Parker, and Imperial Dams and the All-American Canal in the lower basin all with the support and approval of the upper basin States, along with the lower basin States, provided the control and regulation for the delivery of water both for consumptive and nonconsumptive uses in the lower basin.

All these facilities were built under the reclamation law with interest-free money for the irrigation phases and the use of power revenues to help pay the costs.

The intent of the compact is clear. It recognized the equity of all of the States in the river resource. It divided the beneficial consumptive use of water among the groups of States before the water was put to use.

It recognized the absolute necessity of storage and regulation in both basins in order to meet the terms of the compact.

The lower basin developed first with the support of the upper basin. It is now the upper basin's turn.

A feasible project has been developed and in all fairness it should have the support of the lower basin States.

The proposed project clearly described by Mr. Larson yesterday provides for river regulation and control so that all the rights in the lower basin will be fully protected and at the same time makes available for beneficial consumptive use in the next 25 years of only a portion of the waters allocated to the upper basin States.

Full beneficial consumptive use will probably not be reached in the upper basin for 75 years.

The project provides water for consumptive use by direct diversion, or by exchange and power. The net revenues from which will be used to pay the cost of the power facilities with interest and help pay the cost allocated to the irrigation features.

It is self-liquidating and after repayment of all costs will yield to the Public Treasury millions of dollars each year.

Mr. Chairman, a year ago Utah endorsed this project. After another year of study it reaffirms its endorsement.

I would like at this time to present for the record a certified copy of a concurrent resolution of the Senate and the House of Representatives of the 31st Legislature of the State of Utah, memorializing the Congress of the United States to authorize the Colorado River storage project including the Echo Park Dam and participating projects.

Senator WATKINS. By what vote was this passed?

Mr. CLYDE. It was unanimous.

Senator ANDERSON. It may be inserted.

(The document referred to is as follows:)

EXECUTIVE DEPARTMENT, STATE OF UTAH

SECRETARY OF STATE'S OFFICE

I, Lamont F. Toronto, Secretary of State of the State of Utah, do hereby certify that the attached is a full, correct, and true copy of S. C. R. No. 1 which was passed by the 1955 Regular Session of the Thirty-First Legislature of the State of Utah, and signed by Governor J. Bracken Lee on the eighteenth day of January, 1955, as appears of record in my office.

In witness whereof, I have hereunto set my hand and affixed the Great Seal of the State of Utah at Salt Lake City, this 26th day of January 1955.

[SEAL]

LAMONT F. TORONTO,
Secretary of State.

By WENDELL L. COTTRELL,
Deputy.

[S. C. R. No. 1, by Messrs. Stringham, Fowles, and Gronnin]

CONCURRENT RESOLUTION of the Senate and House of Representatives of the Thirty-first Legislature of the State of Utah, memorializing the Congress of the United States to authorize the Colorado River storage project, including the Echo Park Dam and participating projects

Be it resolved by the Legislature of the State of Utah (the Governor concurring therein):

Whereas the waters of the Colorado River and its tributaries have by compact, approved by the Legislatures of the States of Arizona, California, Utah, Colorado, New Mexico, Nevada, and Wyoming, been allocated to these several States, and said compact having been approved by the Congress of the United States in 1922; and

Whereas the upper basin States, consisting of Colorado, New Mexico, Utah, and Wyoming, through the Upper Colorado River Commission and the legislatures

of said States and with the approval of Congress, have allocated their proportionate share of the water of said river among themselves; and

Whereas the conservation and wise use of water of the Colorado River can only be made possible by the construction of strategic storage facilities on said river and its tributaries; and

Whereas the conservation and wise use of water is of foremost importance to the future agricultural and economic development and the general welfare of the Western United States and of the United States; and

Whereas the Upper Colorado River Commission, working in conjunction with the Federal Bureau of Reclamation, has developed a plan, known as the Colorado River storage project, to permit the conservation and wise use of the waters of the Colorado River in the upper basin States; and

Whereas said Colorado River storage project has been developed after many years of investigation, planning, and on-the-ground survey of the storage facilities of the upper Colorado River and its tributaries; and

Whereas said Colorado River storage project has been determined to be the most economical and feasible method of storing and using said waters for the benefit of both the upper and lower basin States; and

Whereas the storage of water as proposed in the Colorado River storage project is vital to permit the upper basin States to meet its commitment to the lower basin States under the compact of 1922 and to have available the uppre basin States' allotment of water as provided in said compact; and

Whereas certain opposition has developed to the inclusion of the Echo Park Dam as proposed in the Colorado River storage project upon the alleged ground that it constitutes an invasion of a national monument; and

Whereas the Echo Park Dam is an integral and necessary part of the upper Colorado River project; and

Whereas at the time the monument boundaries were extended in 1938 to include the Echo Park Dam site such extension of the boundaries was made expressly subject to prior power and reclamation withdrawals; and

Whereas prior to 1938 many reclamation and power withdrawals had been made in this area; and

Whereas the construction of the Echo Park Dam, as proposed in the Colorado River storage project, will not be an invasion of the national monument; nor, because of the reservations incident to the extension of the boundaries of the Dinosaur National Monument, can construction of such dam constitute a precedent for the invasion of any other national park or monument; and

Whereas no portion of the area set aside in the original Dinosaur National Monument will be affected by the construction of said dam; and

Whereas the area in the extended boundaries of the Dinosaur National Monument is inaccessible except to a few who will run the white water of the river; and

Whereas the construction of the Echo Park Dam will make the beauty of the area available to millions who otherwise would not see it and will develop a prime recreational playground; and

Whereas to carry out the intent and purposes of the several compacts approved by the legislatures of the several States concerned, and to carry out the purposes and intent of said compacts as approved by Congresses of the United States, the authorization of the Colorado River storage project by the 84th Congress of the United States is imperative; Now, therefore, be it

Resolved by the 31st Legislature of the State of Utah (the Governor concurring therein), That the 84th Congress of the United States of America be, and it is hereby, memorialized to promptly, thoroughly, and fairly consider and favorably act upon legislation to authorize the Colorado River storage project, including construction of the Echo Park Dam and participating projects; and be it further

Resolved, That certified copies hereof be promptly transmitted to the President and Vice President of the United States, the Speaker of the House of Representatives of the Congress, United States Senator Arthur V. Watkins, United States Senator Wallace F. Bennett, Representative William A. Dawson, Representative Henry Aldous Dixon, the Secretary of the Interior Douglas McKay, the Commissioner of Reclamation, the Upper Colorado River Compact Commission, and the governors and legislatures of the following States: Arizona, Colorado, New Mexico, and Wyoming.

Senator WATKINS. You testified at considerable length a year ago before this committee.

Mr. CLYDE. Yes, sir.

Senator WATKINS. You are making that by reference a part of your presentation today?

Mr. CLYDE. I would like to make part of my presentation by reference my testimony in both the House and Senate committee a year ago.

(The text of testimony by Mr. Clyde before the House and Senate 1 year previous is made a part of his presentation, by reference.)

Senator ANDERSON. Has anything happened in the intervening months that makes that project less desirable?

Mr. CLYDE. No, sir.

Senator ANDERSON. It is even more desirable?

Mr. CLYDE. It is even more desirable today.

Senator ANDERSON. If there are no further questions, thank you very much, Mr. Clyde.

Without objection, we will allow Congressman Thompson of Wyoming and Congressman Dawson and Congressman Dixon to file statements at a later period if they desire to do so, or we may have a chance to hear them later if they should come in.

Mr. David Moffat.

Do I understand that Mr. Moffat and Mr. Patterson are appearing today?

STATEMENTS OF DAVID D. MOFFATT, JR., VICE PRESIDENT, UTAH POWER & LIGHT CO.; AND L. R. PATTERSON, PUBLIC SERVICE CO. OF COLORADO

Mr. PATTERSON. Yes, sir.

Senator ANDERSON. The record will show that Mr. David D. Moffat, Jr., of the Utah Power & Light, and L. R. Patterson, of the Public Service Co. of Colorado, are the next witnesses.

You may proceed, Mr. Moffat.

Mr. MOFFAT. Mr. Chairman, we have prepared a statement that we would like to have made a part of the record and just comment very briefly on that statement.

We request that if in order that statement be printed in large type.

(The statement referred to is as follows:)

STATEMENT BY PRIVATE UTILITIES RE COLORADO RIVER STORAGE PROJECT

Mr. MOFFAT. The following statement made on behalf of Arizona Public Service Co., Public Service Co. of Colorado, Public Service Co. of New Mexico, Southern Colorado Power Co., Southern Utah Power Co., Southern Wyoming Utilities Co., Telluride Power Co., the Western Colorado Power Co., Uintah Power & Light Co., and the Utah Power & Light Co., all operating electric utilities rendering electric service in the upper Colorado River Basin States, sets forth in general terms the factors bearing on potential markets for the disposition of electric energy proposed to be generated in connection with the Colorado River storage project, together with certain proposed principles for cooperation which we think would contribute in a substantial manner to the feasibility of the project in addition to effectuating a substantial savings on the part of the Federal Government in construction costs.

The basin area: The upper Colorado River Basin has a drainage area of 110,000 square miles comprising the western part of the State

of Colorado, the eastern part of Utah, the southwestern corner of Wyoming, the northwestern corner of New Mexico, and the northeastern corner of Arizona. It is an area of lofty mountains, high plateaus, deep canyons, fertile valleys, and great distances.

The basin is very sparsely populated. The average population density is approximately 3 persons per square mile compared to a national average of approximately 51 persons per square mile. Its largest city is Grand Junction, Colo., with a 1950 population of 14,504 inhabitants.

Basin resources: Contrasted with its sparse population is its great wealth of natural resources. These are the measure of its future potential. Here are found large deposits of nonferrous metals and other minerals such as gold, silver, copper, lead, zinc, molybdenum, vanadium, phosphate, gilsonite, limestone, and many others.

Other resources are large forest areas with potential pulp and other forest product industries. Farming, including the growing of fruit and vegetables, and the livestock industry will continue to provide a basic source of wealth.

However, more important for the future than these is the fact that this basin is one of the greatest sources of thermal energy production to be found anywhere in the world. Here are located vast deposits of coal, great underground reservoirs of oil and natural gas, mountains of oil shale and perhaps more important than all of these are the deposits of uranium ores. The potential thermal power resources of this area stagger the imagination.

But the present need of the basin is conservation and orderly development of its most vital resource—water. Water is scarce throughout the States of the Colorado River, both upper and lower basins. More than 30 years ago a compact was signed at Santa Fe, N. Mex., making an apportionment of the waters of the Colorado River between the upper and lower basins. In 1948 the upper basin States; i. e., Wyoming, Colorado, Utah, New Mexico, and Arizona, effected a compact apportioning among those States the water reserved for their use under the Santa Fe compact. In order to protect and develop its share of the water allocated under the compact, the upper basin must provide certain reservoirs for holdover storage. The Colorado River storage project, among other things, provides this storage.

These companies have a twofold interest in this project. First of all, they are concerned with the need for development of the water resources for domestic, agricultural, and industrial use within their service areas both within and without the Colorado River Basin. There is no substitute for water to meet these needs. The long-range growth and prosperity of their service areas is dependent upon additional supplies of water, and such water must of necessity come from the Colorado River and its tributaries.

Their second interest is in the utilization of the power produced in connection with the Colorado River storage project. These companies at the present time are the direct suppliers of electric service to approximately 715,000 electric consumers. Through wholesale service and wheeling service, they are indirect suppliers to an additional 119,000 electric consumers. Their interconnections with other systems further enlarge the electric service areas.

These companies operate 90 power plants, with a total capacity of 1,450,000 kilowatts, of which approximately 1,200,000 kilowatts is steam capacity. The growth in the service areas of these companies is so great that they are adding more than 160,000 kilowatts of additional steam-generating capacity per year. In other words, it is estimated that in 1960 the combined steam-generating capacity of these companies will be approximately 2,200,000 kilowatts. They presently have 6,650 miles of transmission lines interconnecting their plants and load centers with some 1,400 miles additional planned by 1960.

Furthermore, ever-growing needs for electric power in each of our States will provide a market for the power which the project will produce, provided the new generating facilities are put into production on a schedule in consonance with the growing demands for power. We have consistently kept abreast of these growing needs through the construction of additional generating capacity and the extension of our transmission systems. Our plans for the future necessarily entail continuous additions to our generating and transmission capacity so that we shall always be in a position to fill growing needs.

To the extent to which project power becomes available to us at costs reasonably competitive with present or future generating costs, we would be relieved of the cost of constructing an equivalent amount of generating capacity and might be relieved from operating (except for peak and reserve generation) some of the older and higher-cost generating plants on our own systems.

We propose to absorb into our systems and to transmit to present and prospective customers in the upper Colorado River Basin States large blocks of electric power from the hydroelectric plants of the Colorado River storage project and participating projects.

We recognize the financial necessity, as an important adjunct to the Colorado storage project and participating projects, for the generation and sale of hydroelectric power. This necessity arises from the obvious need for a primary source of revenues to help return to the taxpayers of the United States the capital investment in the project as a whole. For that reason the output of these project plants should be disposed of on such basis and in such manner as will best assist the financial feasibility of the project.

Principles for cooperation in the project: Careful consideration of the basic situation as outlined above suggests that there is real opportunity for cooperation between private enterprise and the Federal Government in connection with the marketing of power from the Colorado River storage project. The following are deemed by us to be basic principles for such cooperation:

1. Because of the relationship of the water-storage features of this project to the Colorado River compact, the vast areas encompassed, the magnitude and multiple purpose objectives incorporated—including nonreimbursable features—we believe the holdover reservoirs and powerplants should be built by the Federal Government.

2. In order to obtain the maximum amount of firm power, the greatest diversity and flexibility in operation and to make the power accessible to the greatest area, the backbone transmission tieline directly connecting major powerplants of the Colorado River storage project, such as Flaming Gorge, Echo Park, and Glen Canyon, except

in cases where such interconnections can be more economically and feasibly accomplished through the present and projected transmission systems of the companies, should be an integral part of the generating system, and, therefore, should also be built by the Federal Government. The integration of other plants of the project constructed reasonably adjacent to the present and projected transmission systems of the companies should be accomplished through these systems; the benefits of such integration would accrue to the project without additional cost.

3. In order to obtain maximum flexibility and lowest cost in transmission, it is essential that use be made of the then existing transmission systems of the companies and in addition the companies construct such new transmission lines from the project plants or project interconnecting transmission tielines to the various load centers of their respective systems as may be required to market project power, the Government or other agencies to construct necessary and nonduplicating transmission lines to other load centers not within the general service areas of these companies.

4. The private utilities are willing to enter into contracts whereby they will deliver project power to preference customers, making such reasonable transmission charges therefor as may be approved by the local regulatory authorities; or, the private utilities are willing to contract directly with the preference customers to supply all their power requirements at rates which will pass on such savings as are obtained through the purchase of project power.

5. We believe that the financial feasibility of the project depends upon the sale to private utilities of the power output of the project plants not contracted for by such customers as may be entitled to preference, and that such sales should be made at the powerplants or along the backbone transmission tieline upon terms such that the cost of project power will not exceed the cost of power from alternate sources.

6. Each company as to its rates and charges is subject to the jurisdiction of the State utility commission in which it is furnishing electric service to the public. Rates charged by such utilities for electric service, taking into consideration the cost of power purchased from project plants, will be subject to the full jurisdiction of the appropriate State utilities commission.

To carry out successfully the foregoing principles, it is essential that an understanding be reached in order that these companies may henceforth plan, design, and construct new generating and transmission facilities to coordinate with the project development. The general premises of this understanding should be incorporated in the legislation authorizing the project.

Senator ANDERSON. Do I understand that this statement is being offered in behalf of various public-service companies?

Mr. MOFFAT. Yes, sir. This statement is on behalf of the following investor-owned electric utilities: Arizona Public Service Co., Public Service Co. of Colorado, Public Service Co. of New Mexico, Southern Colorado Power Co., Southern Utah Power Co., Southern Wyoming Utilities Co., Telluride Power Co., the Western Colorado Power Co., Uintah Power & Light Co., and the Utah Power & Light Co.; all

operating electric utilities rendering electric service in the upper Colorado River Basin States.

These companies which Mr. Patterson and I represent have a two-fold interest in this project.

First of all, they are concerned with the need for development of the water resources for domestic, agricultural, and industrial use within their service areas. There is no substitute for water to meet these needs. The long-range growth and prosperity of their service areas is dependent upon additional supplies of water, and such water must of necessity come from the Colorado River and its tributaries.

Their second interest is in the utilization of the power produced in connection with the Colorado River storage project. These companies at the present time are the direct suppliers of electric service to approximately 835,000 electric consumers.

These companies operate 90 powerplants with a total capacity of 1,450,000 kilowatts of which approximately 1,200,000 kilowatts is steam capacity.

The growth in the service areas of these companies is so great that they are adding more than 160,000 kilowatts of additional steam-generating capacity per year.

They presently have 6,650 miles of transmission lines interconnecting their plants and load centers with some 1,400 miles additional planned by 1960.

PRINCIPLES FOR COOPERATION IN THE PROJECT

We believe that there is real opportunity for cooperation between private enterprise and the Federal Government in connection with the marketing of power from the Colorado River storage project.

The following are deemed by us to be basic principles for such cooperation:

1. Because of the relationship of the water-storage features of this project to the Colorado River compact, the vast areas encompassed, the magnitude and multiple-purpose objectives incorporated including nonreimbursable features, we believe the holdover reservoirs and powerplants should be built by the Federal Government.

2. In order to obtain the maximum amount of firm power, the greatest diversity and flexibility in operation and to make the power accessible to the greatest area, the backbone transmission tie line directly connecting major powerplants of the Colorado River project, such as Flaming Gorge, Echo Park, and Glen Canyon, except in cases where such interconnections can be more economically and feasibly accomplished through the present and projected transmission systems of the companies, should be an integral part of the generating system, and, therefore, should also be built by the Federal Government. The integration of other plants of the project constructed reasonably adjacent to the present and projected transmission systems of the companies should be accomplished through these systems; the benefits of such integration would accrue to the project without additional cost.

3. In order to obtain maximum flexibility and lowest cost in transmission, it is essential that use be made of the then existing transmission systems of the companies and in addition the companies construct such new transmission lines from the project plants or project interconnecting transmission tie lines to the various load centers of

their respective systems as may be required to market project power, the Government or other agencies to construct necessary and nonduplicating transmission lines to other load centers not within the general service areas of these companies.

4. The private utilities are willing to enter into contracts whereby they will deliver project power to preference customers making such reasonable transmission charges therefor as may be approved by the local regulatory authorities.

Senator O'MAHONEY. When you speak of preference customers; what do you mean?

Mr. MOFFAT. I mean the preference customers as presently interpreted under reclamation law.

Senator ANDERSON. In the Flood Control Act it provides for utilities and various organizations of that nature owned publicly of a preference.

Senator O'MAHONEY. I am trying to determine whether or not the witness recognizes that law.

Mr. MOFFAT. We certainly do. That is part of the Federal law as we understand it.

Senator O'MAHONEY. You have no contention of any interpretation different from that which has been given heretofore? That there is a real preference, the States and municipalities and the like?

Mr. MOFFAT. That is part of the law at the present time.

Senator O'MAHONEY. You have no desire to change it?

Mr. MOFFAT. Personally I would like to change it sometime, but it is part of the law and until then——

Senator O'MAHONEY. So far as this project is concerned, you are not here advocating any change of that preference?

Mr. MOFFAT. No, sir; not in connection with this matter.

Senator O'MAHONEY. Thank you.

Senator WATKINS. You have heretofore testified at other hearings on this same type of legislation; have you not?

Mr. MOFFAT. Yes, sir.

Senator WATKINS. You testified a year ago before this same committee on a similar bill?

Mr. MOFFAT. And before the House, too.

Senator WATKINS. In each of those appearances you have expressed substantially the same views?

Mr. MOFFAT. That is correct, sir.

Senator WATKINS. You have offered to enter into contracts with the United States for the purchase of this power under the terms that have been more or less mutually agreed upon between you and the Department of the Interior?

Mr. MOFFAT. We have discussed it; yes, sir.

Senator WATKINS. You have discussed at least the possibilities and no contracts have been entered into, but you are willing to accept and abide by the general policy of the Government as laid down by the Congress in the various acts relating to these various types of projects?

Mr. MOFFAT. That is correct.

Senator O'MAHONEY. I am interested to learn, Mr. Chairman, by implication at least, from what Senator Watkins has just said in questioning the witness, that there has been some sort of tentative agreement.

Senator WATKINS. I did not mean that. I mean they have discussed with the Bureau of Reclamation the offers they are willing to make, but there has been no agreement, of course. There obviously could not be.

Senator O'MAHONEY. So that as far as this record is concerned you have not talked about any proposal to change the preference features of the 1944 act?

Mr. MOFFAT. That is correct, sir.

Senator WATKINS. As a matter of fact, you talked on the basis that that law would be fully complied with.

Mr. MOFFAT. If I might read that first sentence again and finish that paragraph, I think it will make our position more clear.

4. The private utilities are willing to enter into contracts whereby they will deliver project power to preference customers making such reasonable transmission charges therefor as may be approved by the local regulatory authorities or, the private utilities are willing to contract directly with the preference customers to supply all their power requirements at rates which will pass on such savings as are obtained through the purchase of project power.

5. We believe that the financial feasibility of the project depends upon the sale to private utilities of the power output of the project plants not contracted for by such customers as may be entitled to preference, and that such sales should be made at the powerplants or along the backbone transmission tie line upon terms such that the cost of project power will not exceed the cost of power from alternate sources.

6. Each company as to its rates and charges is subject to the jurisdiction of the State utility commission in which it is furnishing electric service to the public. Rates charged by such utilities for electric service, taking into consideration the cost of power purchased from project plants, will be subject to the full jurisdiction of the appropriate State utilities commission.

To carry out successfully the foregoing principles, it is essential that an understanding be reached in order that these companies may henceforth plan, design, and construct new generating and transmission facilities to coordinate with the project development. The general premises of this understanding should be incorporated in the legislation authorizing the project.

Now, with reference to that last paragraph I would like to read the following proposed amendment.

(The amendment referred to is as follows:)

At the end of section 1 add the following:

"*And provided further*, That the authority conferred by section 1 of this act to construct transmission lines is limited to:

"(1) Backbone transmission tie lines directly interconnecting powerplants in units of the Colorado River storage project, directly interconnecting such plants with powerplants of participating projects, or directly interconnecting plants authorized in this act with other Federal powerplants, where such interconnections cannot be more economically and feasibly accomplished through the present and projected transmission systems of electric utilities operating in the States of the upper Colorado River Basin;

"(2) Transmission lines between powerplants of participating projects which cannot be more economically and feasibly interconnected by the extension of present or projected transmission lines of electric utilities operating in the States of the upper Colorado River Basin; and

"(3) Transmission lines to municipalities or other public corporations or agencies desiring to purchase electricity and having a preference thereto by law

where there are no existing or projected transmission lines which may reasonably be connected with the aforementioned powerplants or interconnection transmission tie lines between said plants, and where the Secretary is unable to contract with electric utilities to deliver such electricity at charges therefor approved by him and by local authorities having jurisdiction."

Senator WATKINS. Is this the same amendment you proposed a year ago?

Mr. MOFFAT. It is exactly the same.

Senator WATKINS. Which was not reported in the bill by the committee, as I recall it.

Mr. MOFFAT. It is exactly the same as proposed last time. It was not incorporated in the legislation.

We still think it is proper it should be.

Senator ANDERSON. May I say that there are many of us that felt if we were going to incorporate this in this legislation, that we should have had maybe a little more consideration of it. We were pressed for time when we got to it; therefore it perhaps did not receive the same consideration it would have had if we had had plenty of time.

That is why we are having hearings early this year in the hope that we can explore something of this general nature a little more thoroughly than we did last time.

Mr. MOFFAT. I understand thoroughly. But at the same time, we thought this was our opportunity to express this.

Senator ANDERSON. It surely is.

Senator O'MAHONEY. May I ask you, sir, if clause No. 3 of this proposed amendment is intended to preserve the right of the Government to erect transmission lines to all preference customers?

Mr. MOFFAT. It would preserve the right for them to construct any transmission lines to any municipality or other public corporation.

Senator O'MAHONEY. I understand that. I can read what I see. I am trying to find out, not having the act of 1944 before me, whether you intend to cover all preference customers or only those which are mentioned here?

Mr. MOFFAT. No, sir; all preference customers, municipalities, or other public agencies.

Senator O'MAHONEY. Thank you very much. You refer in this amendment to the contract with the Secretary. I assume that in paragraph 4 of your original statement when you said private utilities are willing to enter into contracts whereby they will deliver project power, et cetera, you meant enter into contract with the Secretary of the Interior?

Mr. MOFFAT. That is right, sir.

Senator O'MAHONEY. Thank you very much.

Mr. MOFFAT. We wanted to make it clear that any time the Secretary could not get a suitable contract, then the Department should go ahead and build the lines.

We are willing to enter into such contracts and we think there will be no difficulty in so doing.

Senator ANDERSON. These last 4½ lines bother me a bit. Where you say they can build the transmission lines for customers where there are no existing or projected transmission lines and you say:

and where the Secretary is unable to contract with electric utilities to deliver such electricity at charges therefor approved by him and by local authorities having jurisdiction.

Does that mean that the Government cannot build a transmission line to an REA plant if the Secretary is able to arrange with the private utilities to build one?

Mr. MOFFAT. I think that might be a little confusing, Mr. Chairman. I think there ought to be a paragraph before there——

Senator ANDERSON. In other words, I am sympathetic to your desire to see to it that we don't build a whole lot of additional transmission lines, particularly out in the western country where the distances are very great.

It is too bad to parallel transmission lines, but it sounds a little bit here as if the Secretary first of all has to go to the private utilities there and see if they will build the transmission line and if they will not build it, then the Government can build it.

Mr. MOFFAT. Perhaps the language could be made clearer. The intent is that the authority to construct transmission lines be granted to the Secretary whenever he is not able to enter into a satisfactory contract with the utility to perform these other functions.

Senator ANDERSON. The contract to be satisfactory to him, though it may not be satisfactory to REA.

Mr. MOFFAT. I would not know about that. The Secretary would be the contracting agent under this bill, as I see it, with which the utilities would deal in such matters.

Now, if the REA has certain ideas also, why, certainly that would be taken into account.

Senator O'MAHONEY. Mr. Chairman, it occurs to me that the language was so clear on its face I do not bother asking any question about it.

Senator ANDERSON. I am sorry; it was not clear to me, not being a lawyer.

Senator O'MAHONEY. What this amendment says strictly limits the Secretary of the Interior in making a contract of the kind mentioned here with the preference customers unless the Secretary is unable to contract with the electric utilities. It gives them a preference over the preference customers.

Senator ANDERSON. I was going to say it gives the private utilities a preference clause a little stronger than the preference clause to the public utilities carried by the Flood Control Act.

The Secretary has to say, "I haven't been able to find any private utilities that will do this job under any circumstances" before he can allow a transmission line to be built to serve the preference customers.

Senator O'MAHONEY. It would shut REA out completely.

Senator ANDERSON. I think it would.

Mr. MOFFAT. That is certainly not the intent of the language.

Senator ANDERSON. You testified several months ago and it seemed to me that your attitude was extremely fair and extremely cooperative on this project. I do not want you to get in the position where it looks as if you are not cooperative at all.

Mr. MOFFAT. Our only intention is to protect the rights of the Secretary, the REA's, our preference customers, too. Whenever that cannot be better performed over the transmission lines of the private-power companies, that then they be permitted to step in and do the job instead.

Senator ANDERSON. We have problems of that nature. You are speaking for one of the companies here today that has that very situa-

tion in my State with reference to the new generating plant being built by REA.

I think they are going to be able to work it out nicely. They have been wheeling power back and forth and are working in harmony.

I did not want to restrict completely the right of the Secretary to have the transmission line built if he felt it ought to be built in order to accommodate the preference customers clearly set forth in the law.

Mr. MOFFAT. Our idea is that whenever the Secretary feels he cannot make a proper contract to do this job, then that he step in and contract and do that job himself, building that line and leave the private utilities out of it.

I think it is just about as broad as could be, certainly our intent is in that direction.

If the language needs a little clarification, I am sure we can accomplish that later.

Senator ANDERSON. I was trying to establish for the record what your intent was and what I understood it to be a year ago.

I think under the present Flood Control Act the Secretary has a right to try to find a market for the power.

Senator O'MAHONEY. If he can get the appropriation, he can do it.

Senator WATKINS. In this case he is given the right.

Mr. MOFFAT. All we are trying to do is eliminate duplicating facilities.

Senator ANDERSON. I think most of us have that general desire.

Senator O'MAHONEY. I want to ask merely this: Are there any other utilities, private utilities, so-called—we used to call them public utilities when I was a kid, now we call them private utilities—are there any others in this area which do not join in your statement?

Mr. MOFFAT. There may be some smaller companies, some of the little ones that we have not included in the statement.

We certainly have no indication that any of them do not go along with our statement.

Senator O'MAHONEY. There is no indication of any opposition by any so-called private utility group?

Mr. MOFFAT. None whatsoever.

Senator O'MAHONEY. Or individual company?

Mr. MOFFAT. And we have gone over this statement with each of the 10 companies and have received letters from them authorizing the statement and appointing Mr. Patterson and myself to represent them at this hearing.

Senator O'MAHONEY. Thank you very much.

Senator WATKINS. As I understand it, Mr. Moffat, the general offer is to buy all of the power that is not needed for the operation of the projects themselves and those required for preference customers.

Mr. MOFFAT. That is right, sir.

Senator WATKINS. In other words, the utilities named here are willing to buy the entire output less those customers I have just mentioned.

Mr. MOFFAT. We are willing to buy the entire output provided the plants are put in on a schedule in consonance with the load requirements of the area. If too many of the units were put in at one time, of course, we could not contract to buy all of that at one time.

Senator WATKINS. I understand that, but my experience with the Bureau of Reclamation is that you will never get them all done at one time. You will get them strung along over the years.

Mr. MOFFAT. We have our own construction program that is going forward and we are putting in units all the time. I hope the schedule of putting in these project units will be in respect to the load requirements of the area.

Senator ANDERSON. You say here that you have 90 plants.

Mr. MOFFAT. Yes, sir.

Senator ANDERSON. Has it not been your experience that before you finish the plant almost its capacity is used up, that your load is steadily growing and the consumption of electricity is increasing rapidly as you build these additional plants?

Mr. MOFFAT. That is entirely right and our main job is to have plenty of power there at the time it is needed. That we intend to do.

At the same time we don't want to put in anything in advance of the time required because that just increases the fixed charges ratepayers have to absorb eventually.

Senator ANDERSON. Would it not be your thought that some of these projects will not be finished in their construction until maybe 1968 or 1970. In looking over the whole schedule would it be your opinion that the consumption of electricity in the area served by these utilities would progress enough so that the output can be utilized by the existing utilities and the expansion of the other needs in the area?

Mr. MOFFAT. That is absolutely correct.

Senator ANDERSON. You do not think it is going to be so much that we will have electricity running out of our ears?

Mr. MOFFAT. When our companies are expanding at the rate of 160,000 kilowatts a year now, and the entire project for all of them is only 1,622,000, I see very little probability.

Senator ANDERSON. In other words, it is 10 years growth and it is a 20-year building program. So it is about half as much as necessary.

Mr. MOFFAT. That is right.

Senator O'MAHONEY. Let us conclude then on one conclusion which I draw from the testimony of these two gentlemen representing all of these utilities.

You are in complete agreement that this project should be built?

Mr. MOFFAT. That is right, sir.

Senator O'MAHONEY. You want the Nation to know it?

Mr. MOFFAT. That is right.

Senator O'MAHONEY. Including California?

Mr. MOFFAT. Including California.

Senator WATKINS You want to be ready to take care of the Californians when they move up there?

Senator ANDERSON. Of course, if it is being built in California, the rate of growth would be so much more rapid it would be only 2 years before it would be used there.

Mr. MOFFAT. I think that is right.

I have one brief comment. The companies are installing generating capacity as fast as the present and anticipated needs of their customers require and we can continue to do so.

Electric power from this project is not a necessity; it can be used and that is our principle for cooperation. We can contribute to the financial feasibility of the project by construction of transmission lines. We can market the power and through power revenues assist the project.

I do wish to reemphasize that what we need in our area is water.

Senator WATKINS. Your power would be of very little use unless you have the water?

Mr. MOFFAT. That is right.

STATEMENT OF L. R. PATTERSON, PUBLIC SERVICE CO. OF COLORADO

Senator WATKINS. And this project makes it possible to get both the water, which is the No. 1 requirement, and the power.

Mr. MOFFAT. That is right.

Senator WATKINS. The two together make a powerful team.

Mr. MOFFAT. That's right.

Mr. PATTERSON. Mr. Chairman, my name is L. R. Patterson, my address is 900 15th Street, Denver, Colo. I am assistant vice president electric operations of the Public Service Co. of Colorado.

I had the privilege of testifying before this committee last year when hearings were held on S. 1555, the bill to authorize the Colorado River storage project.

Mr. Chairman, I respectfully request that my statement, which appears on pages 581 to 583 of last year's Senate hearings, be incorporated by reference in this year's record.

Senator ANDERSON. Without objection that will be done.

(The statement referred to is incorporated by reference.)

Mr. PATTERSON. I also wish to state, as Mr. Moffat has said, that the growth in demand for electric power in the service areas of our companies is at a very rapid rate.

These companies are adding generating capacity as fast as we can add it almost, you might say.

As previously stated here, we do not get through installing one unit before we start on a second. In fact, our own company at times has as many as three different jobs underway at the same time.

Now, we want to reaffirm our ability and our willingness to construct and operate the electric transmission facilities that have been outlined by Mr. Moffat. In making this proposal these companies are offering to assume a very substantial financial obligation. We estimate that the cost of the facilities which we have offered to construct may well be $100 million.

We believe that the use of private capital to construct a substantial portion of the power facilities of this project is in the best interest of the general public, the taxpayers and the electric power users of the upper Colorado Basin States.

The use of private money reduces the outlay of Federal funds and it places more property on the local tax rolls to help support local government and schools and then by integrating the hydroelectric power from the project with the large steam-generating plants which we have at the present load centers in the area, it assures the users of the very best service they can have.

It also eliminates the likelihood of a shortage of power during such dry years as may be experienced.

I want to emphasize again that the reason why we suggested an amendment is that we want some assurance that our proposal will be considered; that from this day on we might plan our development of our system so that it will fit in and harmonize with this project.

Since I live in Denver, I am sure you all know how desperately we need water and we certainly endorse S. 500.

Senator ANDERSON. Thank you.

I notice on the Glen Canyon unit the construction development period is scheduled to run up until 1966. It will take 10 full years before the Glen Canyon power would all be available in any one area.

On the central Utah project the power features of that are not scheduled to be finished until 1968.

As you point out, the rate of growth is such that we can look upon the construction of these with some confidence we will not be glutting the market.

Mr. MOFFAT. The rate of growth will be so fast that we will take all the power from this project and the steam plants and atomic plants, too.

Senator ANDERSON. Thank you very much for your appearance, sir.

(The following letter was subsequently received for the record:)

UTAH POWER & LIGHT CO.,
Salt Lake City, Utah, March 12, 1955.

Hon. CLINTON P. ANDERSON,
United States Senator from New Mexico,
Senate Office Building, Washington 25, D. C.

DEAR SENATOR ANDERSON: As you will recall, Mr. L. R. Patterson, of the Public Service Co. of Colorado, and I testified at your committee hearings on March 2 in support of the Colorado River storage project. During the course of our testimony and that of the two witnesses immediately following us it became apparent that a supplemental statement to more clearly express the intent of the 10 major investor-owned public utilities in the upper Colorado River Basin States was necessary. This was discussed with you and you agreed that we could submit such a supplemental statement, a copy of which is attached.

In this statement you will note that our proposed amendment to S. 500 has been revised to obviate the objections or misinterpretations raised during the course of the hearings.

We respectfully request that the attached supplemental report be inserted in the record immediately following the testimony of Mr. Patterson and myself.

Sincerely,

DAVID D. MOFFATT, Jr., *Vice President.*

MARCH 9, 1955.

SUPPLEMENTAL REPORT SUBMITTED BY DAVID D. MOFFAT, JR., AND L. R. PATTERSON IN CONNECTION WITH THEIR TESTIMONY ON MARCH 2, 1955 ON BEHALF OF 10 INVESTOR-OWNED ELECTRIC UTILITIES REGARDING THE PRINCIPLES FOR COOPERATION WITH THE COLORADO RIVER STORAGE PROJECT AND PARTICIPATING PROJECTS

In view of the testimony in this matter it appears desirable that supplemental information be included in the record for clarification of statements made by Messrs. Moffat and Patterson.

Doubt was expressed that item 3 of the amendment proposed included transmission lines to cooperatives. It was certainly our intent that the language used, "other public corporations or agencies," was broad enough to include cooperatives. However, it is suggested to further clarify the intent that the word "cooperatives" be inserted in item 3 after the word "municipalities," and this is contained in the following revision.

There was also doubt expressed as to the meaning of "projected transmission lines" in item 3 of the proposed amendment.

In order to express more clearly the intent of the proposed amendment it has been redrafted. The revised proposed transmission line amendment would then read as follows:

PROPOSED TRANSMISSION LINE AMENDMENT, COLORADO RIVER STORAGE PROJECT AND PARTICIPATING PROJECTS

At the end of section 1 add the following:

"*And provided further*, That the authority conferred by section 1 of this Act to construct transmission lines is limited to—

"(1) Backbone transmission tie lines directly interconnecting power plants in units of the Colorado River storage project, directly interconnecting such plants with powerplants of participating projects, or directly interconnecting plants authorized in this Act with other Federal powerplants, where such interconnections cannot be more economically and feasibly accomplished through the then existing transmission systems of electric utilities operating in the States of the upper Colorado River Basin or through transmission lines which said utilities are willing to provide, under contract for their use at terms and conditions deemed fair and reasonable by the Secretary;

"(2) Transmission lines between powerplants of participating projects which cannot be more ecommically and feasibly interconnected by the then existing transmission lines of electric utilities operating in the States of the upper Colorado River Basin or through transmission lines which said utilities are willing to provide, under contract for their use at terms and conditions deemed fair and reasonable by the Secretary; and

"(3) Transmission lines to municipalities, cooperatives, public corporations, or other agencies where such municipalities, cooperatives, public corporations, or other agencies desire to purchase electricity and have a preference thereto by law, if there are no then existing transmission lines which cannot be more economically and feasibly connected with the aforementioned powerplants or with interconnection transmission tie lines between said plants and if the Secretary is unable to contract with the aforesaid electric utilities to deliver such electricity at charges therefor approved by him and by local authorities having jurisdiction, and if the Secretary is unable to contract with such utilities for the provision by them of such transmission lines on terms deemed by him to be fair and reasonable where there are no such then existing transmission lines."

One other point that apparently was misinterpreted in some quarters has to do with the first clause in principle No. 4 of the prepared statement which reads as follows: "The private utilities are willing to enter into contracts whereby they will deliver project power to preference customers making such reasonable transmission charges therefor as may be approved by the local regulatory authorities;". It was the intent that the language cover socalled "wheeling." It was anticipated that these utilities would enter into contracts to transmit project power to preference customers which, of course, includes cooperatives.

It is intended that the Secretary be authorized to construct transmission facilities to market electricity to agencies listed in the third category of the proposed amendment only after he had been unable to obtain contracts for transmission services from the electric utilities at prices acceptable to him and local regulatory bodies having jurisdiction. The electric utilities expect to provide such service over existing transmission lines or transmission lines that would be constructed at the time of need. Thus the United States would be relieved of unnecessary expenditures.

Senator ANDERSON. Next is Mr. McDonald.

Will you state your name and your connection, please?

Mr. MCDONALD. Mr. Chairman and members of the committee, my name is Angus McDonald. I am assistant legislative secretary of the National Farmers Union.

I think I will dispense with the reading of my statement and read a brief press release which was issued by the National and Rocky Mountain Farmers Union a little more than a year ago. My position has not changed since that time.

Senator ANDERSON. The statement will appear in this record, however, at this point.

(The statement and press release are as follows:)

STATEMENT OF ANGUS MCDONALD, LEGISLATIVE ASSISTANT, NATIONAL FARMERS UNION, TO THE SENATE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS, IN SUPPORT OF THE UPPER COLORADO DEVELOPMENT

Mr. Chairman and members of the committee, I am here to present the position of our organization in regard to S. 500 which authorizes the Secretary of the Interior to construct, operate, and maintain the Colorado storage project and participating projects. We fully endorse this legislation and feel that it is entirely consistent with the policies of the National Farmers Union adopted by delegates of the biennial convention at Denver, Colo., March 15–19, 1954. Furthermore, endorsement of upper Colorado development is entirely consistent with policies adopted by previous Farmers Union conventions—local, county, State, and National.

I quote briefly from the policies adopted at our convention last year. At that time the Farmers Union went on record as favoring a policy which would fulfill the responsibility of the Federal Government for assuring an electric power and water program that would fully serve the people's needs. We favored at the convention the following principles:

"RURAL ELECTRIFICATION AND THE FEDERAL POWER PROGRAM

"(*a*) To fulfill the responsibility of the Federal Government for assuring an electric-power program that fully serves the people's needs, we favor the following principles:

"(1) Establishment by Congress of the principle of Federal utility responsibility for that portion of regional power supply required to meet the expanding needs of present or future nonprofit electric systems and to support sound expansion of the regional economy.

"(2) Legal provisions requiring that preference be given to public and cooperative nonprofit agencies in sale of wholesale energy produced by Federal projects must not be impaired.

"(3) Establishment by Congress of regional development agencies which will recognize hydroelectric development as a primary objective of multiplepurpose river-basin programs, but will also provide for the optimum conservation and development of all values, including flood control, navigation, irrigation, recreation, and others.

"(4) Construction by Federal agencies of steam-electric stations and transmission lines necessary to firm hydro power and meet power requirements of service areas, and to carry that power to load centers.

* * * * * * *

"(6) Full technical and financial support for the vertical as well as horizontal expansion of the rural electric program, including:

"Assistance to generation and transmission cooperatives where needed to provide the member cooperatives with an abundant power supply in the future; financial and technical assistance in acquisition programs; and

* * * * * * *

"Removal of population limitations on communities which rural electric cooperatives may serve, which are creating serious problems in connection with annexations and community growth, and which deprive communities of a free choice as to who shall serve them.

* * * * * * *

"(*f*) The cause of the Central Valley of California, the New York-New England area, Hells Canyon, the Columbia Basin, the Tennessee Valley, the upper Colorado, including Echo Park, the Missouri, the Southwest, the Southeast, and other areas, is each the cause of every one of us. * * *"

Development of our natural resources, as indicated by these resolutions, is necessary if farmers and other citizens are to be supplied with electric power and with sufficient water to irrigate the arid lands. This is particularly true in the upper Colorado watershed where the runoff varies widely from year to year. Records indicate the virgin flow per year has ranged from 5,640,000 acre-feet in the upper Colorado to a high of 24,027,000 acre-feet. This simply means that in dry years there is insufficient water and that in wet years water flows into the lower channel which should be impounded and held for future use. It is difficult to see how the region can be developed unless a number of water-storage projects such as are called for in this bill are completed. Few will contend that conservation of the water resources is not absolutely necessary if develop-

ment of the vast upper Colorado watershed area goes ahead. Conservation of water, of course, is the key that will unlock the door to hydroelectric industrial and agricultural development of the area.

I call attention to a sample study of 16 reclamation projects which was made by the Department of Interior to which reference is made on page 153 of the hearings before the House Subcommittee on Irrigation and Reclamation of the Interior Committee in January 1954. According to the conclusions reached in this study, benefits accruing to the Nation and to the areas affected by reclamation projects are far greater than the cost of the projects. It is estimated, based on this sample study of 16 projects, that by 1952, 59 reclamation projects had returned $2,700,000 to the United States Treasury. This is an amount greater than total reclamation expenditures for all reclamation projects from the beginning of the reclamation program to 1952 when the study was made.

Benefits from reclamation projects, of course, are not merely limited to dollars paid into the United States Treasury. Of greater value are the benefits in increased crop production, livestock raised, farm income and industrial development. In every area where the Federal Government has made an investment in reclamation, it has resulted in increased payments to the Government by the beneficiaries in income taxes. The prosperity of an area affected directly by reclamation development can also be related to expanded business activities in adjacent and surrounding areas and in fact to every area and every segment of society throughout the Nation. The reclamation program has provided economic stability to the Nation and has made possible the development of areas which would be completley worthless without a reclamation program

Turning to the specific problems in the upper Colorado area as they relate to the program which this bill would authorize, it would appear that as a simple matter of economic justice that the people in the upper Colorado area are entitled to their share of the water in the Colorado River and its tributaries. According to testimony before the House committee and this committee, the lower basin has been using most of its share of the water under the 1922 compact but there is no comparable use in the upper Colorado area. More than two-thirds of the water which belongs to the people in this area is lost to them because they have no way to impound or use it. Under the 1922 compact, the water was fairly divided between the two regions, the lower region being entitled to an average of 7½ million acre-feet a year, over a 10-year period.

It seems a matter of commonsense to us that a way should be found to assure the people in the lower basin the right to their rightful share and at the same time provide a way for the people in the upper basin to utilize the water which rightfully belongs to them. Engineers tell us that over a long period of time, if the water can be conserved, there is enough for all. They tell us also that any water-conservation plan must take into account the high evaporation losses that would result if projects were developed at so-called poor sites. The engineers and scientists in the Department have indicated that they cannot honestly recommend sites such as Desolation, Bluff, and Dewey either because they are economically unfeasible, would experience high evaporation losses, or produce a relatively low amount of power.

Sites other than those recommended by the Department of Interior have been suggested because it was contended that the building of a dam at the Echo Park site would be an invasion of the national park system and would forever mar the natural beauty of the area. The record will show that the original monument created by President Wilson consisted of 80 acres which would not include Echo Park, and when President Roosevelt expanded the monument by Executive order in 1938, that he provided that expansion of the monument should not bar the building of power projects.

In other words, the Echo Park site has never been part of the national park system. The mere fact that it was called a park did not make it a national park. It is also contended that development of the water resources of the upper Colorado and the Echo Park site would impair it as a recretional center and that in some way it would disrupt the Dinosaur Monument. Geography indicates that the bones of the dinosaurs, if any, would not be disturbed because the dinosaur graveyard is down the river from the Echo Park site. Impounding water behind the Echo Park would not submerge a single Dinosaur bone. On the contrary, the proponents of the project tell us that the creation of a huge lake behind the Echo Park would enhance the recreational opportunities and that roads would be built into the area so that many more thousands of people could enjoy recreational activities, whereas at the present time the area is relatively inaccessible.

Finally, we urge the approval of this legislation because of the enormous amount of cheap hydroelectric power that will be produced. It has been estimated that this power will be generated at an overall average cost of around 6 mills per kilowatt and that the power will be used, since there is a power shortage in the area and since the need of the area for power is increasing by leaps and bounds. Power will make possible the development as a whole economically feasible and all the funds which are invested in the projects will be returned with interest over a period of 50 years. Power revenues in part will be used to pay for that part of the irrigation projects which the participants in the projects are not able to pay. Thus in the long run the Government will recover all of the money invested, plus interest on that part of the project which is allocated to power.

In regard to the preference clause, we suggest that the language of section 3 of the bill be made more explicit or that the legislative history be made to show that Congress intends under this legislation for cooperatives and public bodies to have first call on power generated at any and all of the upper Colorado projects. We realize that only 10 percent of the power will be needed by cooperatives and public bodies, but we are anxious to see that they have every opportunity to fully utilize this power and thus preserve the principle of low-cost power to the consumer. If the yardstick principle is preserved in the marketing of this power, it will have beneficial effect, not only on the rural electric cooperatives and public bodies, but will have a healthy competitive effect throughout the area which will result in low-cost power to consumers served by private electric power companies.

DENVER.—The National and Rocky Mountain Farmers Union Saturday announced they are strongly in favor of the construction of the upper Colorado storage project and its vitally important Echo Park Dam.

James G. Patton, president, said that contrary to published reports, the farm organization would support construction of the project.

"Our staff has carefully studied the project and we sincerely believe its speedy construction would be in the best interests of the region. While we are perfectly aware of the importance of Dinosaur National Monument as an historic spot and tourist attraction, we have come to the conclusion that the proposed storage project would enhance rather than despoil the area.

"We have been far from impressed with arguments presented so far that there are equally suitable locations for the site of the Echo Park Dam," Patton said. "The area to be covered by the proposed dam contains extremely few farms and ranches.

"For these reasons, as well as the attitude expressed by our members in the area to be served by the project, we will strongly support its development."

Mr. MCDONALD. Now, I would just like to call the attention of the committee to the paragraph on page 5 of my statement in regard to reference. I believe this is the final paragraph. If I may, I will read that paragraph.

In regard to the preference clause, we suggest that the language in section 3 of the bill be made more explicit or that the legislative history be made to show that Congress intends under this legislation for cooperatives and public bodies to have first call on power generated at any and all of the upper Colorado projects.

We realize that only 10 percent of the power will be needed by cooperatives and public bodies, but we are anxious to see that they have every opportunity to fully utilize this power and thus preserve the principle of low-cost power to the consumer. If the yardstick principle is preserved in the marketing of this power, it will have beneficial effect, not only on the rural electric cooperatives and public bodies, but will have a healthy competitive effect throughout the area which will result in low-cost power to consumers served by private electric-power companies.

Now, I have only one final point, Mr. Chairman. In regard to the publication of an article in Collier's magazine on February 18, 1955, our national president, Mr. Patton, has written to the editor of Collier's magazine in regard to this statement. The statement that we took exception to in the Collier's article was this:

They are discussing the upper Colorado development and the Echo Park project. I quote the editor:

moreover, nearly 50 million Americans from all over the country visit the national parks each year, and 98 percent of the cost of the dam project would be borne by people far removed from the area. One-third, for example, would be paid by the taxpayers of New York, Ohio, Pennsylvania, Illinois, and Michigan.

I continue reading a portion of Mr. Patton's letter to the editor:

I call your attention to the statement of Ralph A. Tudor, Under Secretary of Interior, when he appeared before the House Committee on Interior and Insular Affairs on January 18, 1954.

Senator O'MAHONEY. Mr. McDonald, may I interrupt you to ask from what portion of this Collier's article the original language which Mr. Patton objected to was taken?

Mr. MCDONALD. As I recall——

Senator ANDERSON. Was that not an editorial?

Mr. MCDONALD. That was an editorial, I believe sort of an introduction and interpretation of the whole overall project and controversy.

Senator O'MAHONEY. It had no reference to that part of the article of which the junior Senator from Wyoming was author?

Mr. MCDONALD. I am glad you are bringing that out now. I would like to read the first paragraph of the letter. I did not think maybe it would be quite in good taste to read it, but I will read it now since Senator O'Mahoney has mentioned his part of the Collier's article.

Senator ANDERSON. Go right ahead. Good taste has no part in these hearings.

Mr. MCDONALD. The first paragraph, is as follows, Mr. Chairman:

Our attention has been called to your article entitled "Are you for or against the Echo Park Dam?" in your February 18 issue. We appreciate the very fair way in which you presented both sides of the issue and feel that Senator O'Mahoney did an excellent job in debunking the idea that the Echo Dam project would spoil the natural beauty of the area.

Senator ANDERSON. Has there been previous collaboration between you and Senator O'Mahoney that he asked that question?

Mr. MCDONALD. No, sir.

Senator ANDERSON. Very well; you may proceed.

Senator O'MAHONEY. So many people seem to think that I wrote the whole article that I wanted it to be clear that I did not write the part to which exception is being taken.

Senator ANDERSON. Very well.

Mr. MCDONALD. I will continue reading the part of the letter which refers to testimony of Ralph A. Tudor, Under Secretary of the Interior, when he appeared on a similar bill last year in reference to this development:

Rates for the sale of municipal and industrial water and power will be established so that the cost of each facility will be fully returned to the United States within a period of 50 years or less from the time that facility is put into service. Irrigation water users will be required to repay to the maximum extent of their ability for 50 years.

The portion of the cost allocated to irrigation which exceeds the repayment ability of the water users will be returned to the United States by the net power revenues after the power facilities have been paid out. It is contemplated that new construction be scheduled so that all of the reimbursable cost of each participating project will be repaid to the United States within 50 years of the time that the particular unit is completed and placed in operation. Small amounts

would be allocated to flood-control and other nonreimbursable purposes. If additional storage units and participating projects are added to the recommended plan, either a slightly longer period of irrigation repayment or a slightly higher power rate would be required to supply the necessary irrigation assistance.

That is the end of the quotation from Mr. Tudor.

The letter goes on:

The rule followed in setting up the repayment plan for the upper Colorado development is the one generally followed in all reclamation and hydroelectric projects. No project is authorized unless an exhaustive investigation in regard to its economic feasibility has been made by the proper authorities.

In fairness to your readers, we would appreciate it if you would publish this communication.

Sincerely yours,

JAMES G. PATTON, *President.*

Senator ANDERSON. Now the article said that a third of this cost would go against New York State alone. Do you suppose the people of New York State are going to buy much power from the Glen Canyon Dam? I do not think they would.

Mr. MCDONALD. I think, Senator, in the long run this will help the people of New York State because the manufacturing industries in that State can sell their products to the people of the upper Colorado area.

Senator ANDERSON. But the point Senator Watkins made so consistently and I thought so soundly, all during the hearing 8 or 10 months ago, was that the people in the area are going to pay the entire cost of this project. They are going to pay part of it for irrigation water; they are going to pay the rest of it for power and they themselves will finally pay the entire cost of this project.

I am happy that the Farmers Union supports that position and confirms what Senator Watkins said.

It is the only sound view to take. The Federal Government is making only a very small contribution here. There is very little flood control; there is very little wildlife, recreation, and other charges that can come against it in this entire project.

I am happy that your organization has supported that point of view.

Mr. MCDONALD. Thank you, Mr. Chairman.

I would like to make one final point. In regard to the amendments suggested by Governor Johnson yesterday and by the previous witnesses, I believe two witnesses, I think it is safe for me to say we are against all these amendments. We are opposed to any restriction on the responsibility and the duty of the Secretary of the Interior to build transmission lines to bring this power out to the cooperatives.

The cooperatives do not have the resources in them, in nearly all instances to do that job.

As a matter of history, it has been a consistent plan of the utilities to get between the dam and the cooperatives in some way so that they could not enjoy their preference rates.

Senator ANDERSON. You believe, fully, then, the carrying out of the Flood Control Act of 1944, as far as its preference provisions are concerned, and making sure that the Secretary can build the necessary transmission lines if he needs to?

Mr. MCDONALD. Yes.

Senator O'MAHONEY. Has anything transpired, Mr. McDonald, of which you are aware, which would lead anybody on sound grounds to

say that the REA cooperatives have not been beneficial to the areas in which they have been created?

Mr. McDONALD. I don't think any argument has even been advanced by the private utilities themselves in regard to that point that you mention.

If the committee will permit me to generalize this for a few seconds, I am amazed at the length to which the private utilities will go in attempting to discredit the rural electric cooperatives. I refer you to a full-page advertisement in the last issue of the American Magazine. I will furnish that to the committee if any member is interested in seeing the advertisement.

Senator O'MAHONEY. I would like to see it.

Mr. McDONALD. They stated in this article that the 4 million farm families enjoying the benefits of electricity are being subsidized by all the rest of the population in regard to their rural electric cooperatives. It is one of the most outrageous statements that I have ever seen.

Senator WATKINS. You have not heard anything from any of the utilities in any way attacking the REA's, have you?

Mr. McDONALD. No, sir.

Senator WATKINS. I have not, either.

Mr. McDONALD. Except, Senator Watkins, I interpreted that amendment in somewhat the same way that the chairman and Senator O'Mahoney did, which was suggested.

Senator WATKINS. This committee did not have all the time it needed to consider it, but last time it was put in the bill.

Mr. McDONALD. I appreciate that.

Senator WATKINS. Of course, the committee will take a good look at it and see that the purpose of the flood control act and all other acts granting these preferences are complied with. Any amendments that are placed in this bill, I am sure, will be placed there in the light of the present law.

Senator ANDERSON. Are there any further questions?

Thank you very much, Mr. McDonald.

Tomorrow the California group will be given an opportunity to present their testimony, and, if need be, on Friday.

We hope that we can get through the hearings this week. It may be necessary to run a little later on some of these sessions, but we would like to finish these hearings at the end of this week.

Mr. Fain, it seems like only a few hours that I was hearing your testimony before the Joint Committee on Atomic Energy, but I am glad to welcome you over here.

STATEMENT OF CHARLES J. FAIN, LEGISLATIVE ASSISTANT, NATIONAL RURAL ELECTRIC COOPERATIVE ASSOCIATION

Mr. FAIN. I am Charles J. Fain, and this is Mr. Robinson, our electrical engineer, who has done a great deal of research in this matter, especially pertaining to power in the Colorado project.

I am somewhat at a loss as to how to proceed. You have been here many days on these hearings and have taken many hours this morning.

However, a subject has been interposed in the hearing that we were not aware of and it may be that we have been somewhat remiss in that we were not aware of it. We were not aware of the proposed

amendment which has just been presented to your committee. As I say, I was not aware it had been presented previously. Evidently it had in prior years, but I simply missed it.

Senator ANDERSON. Why do you not go ahead with your testimony as if it had not been presented. If at a subsequent time we feel we need additional testimony on this from REA and other preference customers, we will be very happy to call you back.

Mr. FAIN. In that regard, would it be possible to prepare a supplemental statement for the record on this matter?

Senator ANDERSON. You can prepare a supplemental statement for the record on the amendment which has been offered and it will appear in the record at the conclusion of your remarks.

Mr. FAIN. Mr. Chairman, we will be as brief as possible and simply try to highlight the statement which we prepared.

We are here representing the rural electric cooperatives throughout the United States and especially those who would hope to get the power from the upper Colorado project; that is, a part of the power from that project. Our interest here before the committee is because of the interest of those rural electric systems in the area in their need for additional power.

At the present time there is a definite shortage of power in the area for the rural electric cooperatives. I would like to bring that out somewhat by the chart which has been prepared, table 1, the last page of the statement.

I might be able to highlight that somewhat and not go into too much detail on it.

You will note that when we appeared before the committee a year ago we presented certain figures to the committee on the growth of the need for power of the rural electric cooperatives in this entire area.

You will note that in 1952 the first column shows that the total annual energy consumption in millions of kilowatt-hours was 87.84.

Now, we are prepared to show you that during 1953 this increased from 87 to 102.

In other words, this is over a 17-percent increase in 1 year. This is just an indication of the tremendous load growth of these systems out there in that area. It shows that the increase is such that in a period of a little over 4 years their load growth is doubled.

Consequently, they are very much interested in the additional power that might flow to them from these projects.

In addition to this, Mr. Chairman, it might be pointed out to the committee that the rural electric cooperatives in other parts of that area, that is outside the upper Colorado River storage area, itself, are interested in these projects. They are interested because there is also a shortage in their area.

They have been informed by the Bureau of Reclamation that their needs for firm power cannot be met beyond 1956, as well as those cooperatives in the area have been informed that their needs cannot be met by the Bureau of Reclamation for firm power beyond 1956.

Consequently, so far as power is concerned, we are very much interested that construction proceed as quickly as possible under the Senator's bill.

However, I think that there is a note here that we should hit on. That is this matter of preference. It has been talked about this

morning before your committee and I would like to go into that matter somewhat.

We are very much pleased with this present bill, Senate bill 500. Like other bills that have preceded it, it provides for preference; that is, in accordance with the reclamation laws.

So unquestionably the bill as it was drafted, Mr. Chairman, does provide that preference. We are very happy to see that.

However, according to some of the proposals that were made last year, and we had seen them, that had been printed in the records of the House committee on this matter (and evidently those proposals were very similar in nature to the ones that were made to your committee this morning) we are somewhat anxious that preference in the traditional sense will not be carried out if those proposals are adopted.

I think that is the meat of our testimony here to you today, Mr. Chairman. We will simply try to go into that somewhat and leave the rest of the statement.

Senator ANDERSON. Your feeling is that if the proposals that were made in the House report which is referred to on page 7 of your statement, and the amendment, for example, that was suggested this morning, that it would in some degree nullify the preference clause existing in the present legislation or proposed in this bill?

Mr. FAIN. We feel that it would certainly weaken the administration of the preference law as it has been done in the past.

Now, it may be well to tell you exactly why we feel that way. In the first place, it must be recognized that the rural electric cooperatives are not taking the position that transmission lines should be built by the Federal Government to serve all of their needs.

Certainly that is not our position. However, it should be made clear that the rural electric cooperatives do feel that there should be ample authority in the bill and in any law passed so that the Secretary of the Interior, if he found it necessary, could build transmission lines. That is the matter which concerns us in listening to the testimony and reading the amendment that was presented this morning.

If I may just comment on the amendment that was proposed to your committee this morning.

Senator ANDERSON. You were going to file a supplemental on that, were you not?

Mr. FAIN. Yes, sir.

However, this follows quite closely to what was reported in the hearing and it is covered somewhat in my statement.

Senator ANDERSON. Very well.

Mr. FAIN. There are basically two points in the amendment that I think should be pointed out to the committee for possible clarification. In the first place, if the committee will look closely at the language in the amendment down to No. 3, it says:

> Transmission lines to municipalities or other public corporations or agencies desiring to purchase electricity and having a preference thereto by law.

I am somewhat concerned that it does not say in No. 3:

> Transmission lines to municipalities, rural electric cooperatives, or other public corporations or agencies—

which is paraphrased somewhat, but is the language in the Reclamation Project Act and also in the Flood Control Act.

In other words, this seems to exclude rural electric cooperatives when it points out public corporations, because they are not municipalities, nor are they agencies.

I cannot see that the agencies would refer to the electric cooperatives. It seems to me that the word "agencies" would refer to some other public corporation or public agencies.

Senator ANDERSON. Obviously if it does exclude the REA cooperatives, I think you could safely figure that the committee would probably try to write in language that did protect the REA cooperatives.

I have a feeling that the people who proposed it felt that the word "agencies" included cooperatives.

There is nothing in the testimony that scared me on that point at all. I think their intention was perfectly clear. They did intend to cover those bodies that were covered by the Flood Control Act of 1944 and I think stated very plainly.

So I don't think you have to worry on that score.

Mr. FAIN. I gathered from the testimony, if that is the intention it would not be any harm at all.

Senator ANDERSON. I think your obligation is to protect the REA cooperatives if you think they are in danger. I am merely saying I would not waste any sleep on it because I do not think they are in danger.

Mr. FAIN. Thank you, Mr. Chairman, for that assurance.

Senator ANDERSON. That is only one man's opinion.

Mr. FAIN. Now, you will note that there are certain conditions that would have to be met, however, under No. 3, even before transmission lines could be built. Those conditions are that there are no existing or projected transmission lines.

Now, there are two conditions. I simply don't know what projected transmission lines would mean, but as I read the langauge, if there were projected, that is planned, transmission lines, then the Secretary could not build.

Now, the other point, and I think it is very significant here, states that—

and where the Secretary is unable to contract with electric utilities to deliver such electricity at charges therefor approved by him and by local authorities having jurisdiction.

It seems to me, Mr. Chairman, under that amendment that this would actually tie the hands of the Secretary of the Interior because he would have to first show that he was unable to contract with the electric utilities to deliver such electricity at charges approved by him.

Now, he could approve any sort of charge. Second, approval of local authorities having jurisdiction must be obtained.

The big part of our statement goes to the meat of this situation in that we feel the Federal Government through the Department of the Interior, if it has the power to build transmission lines, then the Federal Government itself is in a better bargaining position in the sale of this power.

I think that is awfully important to keep in mind when we consider that this project's feasibility is basically based upon the sale of power.

What if the hands of the Secretary would be so tied that it could not be sold at a figure which would show the projects to be economically feasible. As we understand it, under the report of 1950, that charge is now set at about 6 mills. If we come up with language which would possibly force the Secretary to sell that power at a cheaper rate, then the whole feasibility of this project would be in danger.

Senator ANDERSON. Of course, the theory has been frequently expressed by REA's that they have trouble in getting the private utilities to get the rates down. So I do not just understand your argument if the rate came down because of these things and the public utilities, the cooperatives got the other end of the lower rate they would not be damaged.

I may be able to short circuit this a little bit by saying that there are a great many people who are concerned with this problem and have wrestled with it at times and they are not anxious to go out and cut off the rights of the REA cooperatives to get power on a fair basis.

My own feeling is that the private utilities in this area have been living with the REA cooperatives pretty successfully out there. They are doing a little better job, I believe, in some of these States than in some others.

And the people concerned with this are going to make sure that the Secretary of the Interior will find a good market for this energy.

It is greatly to the advantage of the existing private utilities that these projects be built, because we can have enormous growth in any of our cities out there and rural areas if these projects are built.

I feel we will be able to work out language eventually that will not frighten the REA cooperatives too much if we put it in the bill.

Mr. FAIN. I agree with your statement, especially going to this point that the private utilities and the rural electric cooperatives in the area are endeavoring to work out these agreements.

In fact, one such agreement is a wheeling arrangement, a wheeling contract, which carries the power from the Colorado-Big Thompson project. But we feel that this amendment as it is presented and the testimony as I heard it, did not actually spell out a wheeling contract.

The alternatives presented were that the power company would take the power and would resell it to the rural electric cooperatives.

Mr. Chairman, that is not the arrangement that is existing out there now in Colorado and which has been working quite well. That is one reason that there is some concern.

The wheeling contract by which the power company carries that power over its transmission lines to the preferred customer is one which the rural electric cooperatives are in sympathy with.

But it does not mean that title to the power is taken by the power company from the Department of the Interior and then resold to the rural elecric cooperatives. Under the wheeling contract it means that the rural electric cooperative is a customer of the Bureau of Reclamation. As such they deal directly with the Federal Government.

Now, if that was the proposition that was proposed to your committee, certainly we would be in accord with it. I think, as you say,

it has worked quite well out there, but that is one of the things that it seems to me the committee would be interested in doing when it looks over these proposals, is to see whether or not that is a wheeling contract that is being talked about, or whether it is a sale of the power.

Senator ANDERSON. You are satisfied with the language of the bill at the present time, are you not?

Mr. FAIN. Yes, sir, we are, Mr. Chairman; we are very happy with it.

Senator ANDERSON. I am just trying to suggest that I think you can safely leave to the people who are sponsors of that bill a desire to make sure that the co-ops are not choked off.

As far as I am concerned, I have had not at any time a representation from any utilities out there indicating they would like to chop the REA cooperatives out of the use of some of this power. I hope it stays that way.

Mr. FAIN. Mr. Chairman, there is one other point I would like to raise, covered in the statement, and that is that there is language in the budget request that might be called to the attention of the committee. That concerns this language. In the Federal budget there was this statement with respect to the Bureau of Reclamation appropriation request:

> That no part of the appropriation shall be used to initiate construction of transmission facilities within those areas covered by power wheeling contracts which include provision for service to Federal establishments and preferred customers, except those transmission facilities for which construction funds have been heretofore appropriated, those facilities which are necessary to carry out the terms of such contracts or those facilities for which the Secretary of the Interior finds the wheeling agency is unwilling to provide for the integration of Federal projects or for service to a Federal establishment or preferred customer.

That language indicates somewhat of a change in what we have considered to be the traditional treatment of preferred customers under Bureau of Reclamation authority.

We would hope that no such restriction as this showed up in the bill, Mr. Chairman.

In summary, I would simply like to state, Mr. Chairman, we appreciate the opportunity to come before your committee. If we may, we would like to include this table and then there is a resolution passed by the National Rural Electric Cooperative Association at its recent annual meeting in regard to the upper Colorado storage project. We would like to ask the permission of the chairman and the committee to also include that in the record.

Senator ANDERSON. That will be done.

Mr. FAIN. That will conclude our statement, Mr. Chairman, and we thank you and the committee for your comments.

Senator ANDERSON. Thank you very much.

The table will be included in the record at this point.

(The table referred to and the formal statement of Mr. Fain, are as follows:)

TABLE 1.—*Estimated yearly energy cost savings to electric cooperatives in and adjacent to "principal portion" of Colorado storage project marketing area*

[Except as noted, figures are for fiscal years 1952 and 1953 from 1952 and 1953 Annual Report of Energy Purchased by REA Borrowers, and 1951 and 1952 Annual Statistical Report published by REA]

State	Name of cooperative		Annual energy consumption, thousand kilowatt-hours		Present average rate, mills per kilowatt-hour		Present annual cost of energy		Annual cost of energy at 6 mills per kilowatt-hour		Annual savings at rate of 6 mills per kilowatt-hour	
			1952	1953	1952	1953	1952	1953	1952	1953	1952	1953
Colorado	Grand Valley Rural Power Lines, Inc.	7	6.62	7.56	8.9	8.9	$58,683	$66,937	$39,720	$45,360	$18,963	$21,577
	San Luis Valley Rural Electric Co-op	14	12.96	9.45	8.8	9.3	114,099	87,572	77,760	56,700	36,339	30,872
	Gunnison County Electric Association	18	1.10	1.12	18.0	18.0	19,780	20,177	6,600	6,720	13,180	13,457
	Delta-Montrose Rural Power Lines Association	20	5.52	6.26	10.7	12.0	59,110	74,943	33,120	37,560	25,990	37,383
	San Miguel Power Association	26	11.01	13.21	9.1	10.2	100,431	134,643	66,060	79,260	34,371	55,383
	La Plata Electric Association	32	6.14	6.92	9.8	11.0	60,310	76,018	36,840	41,520	23,470	34,498
	Empire Electric Association	33	10.51	12.10	9.8	10.8	103,282	130,728	63,060	72,600	40,222	58,128
	Holy Cross Electric Association	34	3.07	3.84	8.0	8.0	24,590	30,736	18,420	23,040	6,170	7,696
	Yanpa Valley Electric Association	36	3.31	2.02	12.0	7.0	39,958	14,224	19,860	12,120	20,098	2,104
	White River Electric Association [1]	40	1.83	1.85	17.5	1.9	32,501	35,277	10,986	11,100	21,515	24,177
	North Park Rural Electric Association	42	.88	5.65	7.0	6.2	6,185	34,990	5,280	33,900	905	1,090
	Northern Rio-Arriba Electric Co-op	15	1.87	2.08	18.3	17.8	34,200	36,964	11,220	12,480	22,980	24,484
New Mexico	Raft River Electric Co-op	16	4.32	6.40	5.6	5.8	[2] 24,021	[2] 37,032	[2] 25,920	[2] 38,400		
Idaho	Garkane Power Association	6	4.30	4.39	14.0	14.3	60,231	62,933	25,800	26,340	34,431	36,593
Utah	Moon Lake Electric Association [1]	8	7.81	10.80	8.4	11.0	65,627	119,066	46,860	64,800	18,767	54,266
	Riverton Valley Electric Association	3	4.46	6.75	6.8	6.8	[2] 30,143	[2] 45,701	[2] 26,760	[2] 40,500		
Wyoming	Bridger Valley Electric Association [1]	9	2.13	2.35	10.9	13.7	23,261	32,301	12,780	14,100	10,481	18,201
Total			87.84	102.75			802,248	957,509	474,366	537,600	327,882	419,909

[1] Generates own power, figures for calendar 1951–52.

[2] Not included in total.

Mr. FAIN. Mr. Chairman and gentlemen of the committee, my name is Charles J. Fain. I am legislative assistant of the National Rural Electric Cooperative Association, the national service organization of approximately 90 percent of all REA electric-type borrowers in the United States and Alaska.

The interest of the rural electric systems: The rural electric cooperatives located in and adjacent to the power marketing area of the Colorado River storage project are hopeful that at least some of the major power-producing facilities of the upper Colorado River project may be put under construction in the very near future for two reasons.

First, the rural electric systems located in the power marketing area to be served by the project face a shortage of available power supply from existing sources, especially for irrigation wells. Second, they are of the opinion that construction and operation of the project will permanently enhance the economic productivity of their respective service areas, thereby promoting the growth and development of the rural electrification program in that section. This statement will be confined to a discussion of the first proposition, although we recognize the second as an important factor for the consideration of your committee.

Last year, in appearing before this subcommittee, there was presented, as part of our testimony, a chart containing a list of rural electric systems which lie within or directly adjacent to what has been designated by the Bureau of Reclamation by the 1950 Report as the "principal portion" of the power marketing area for the Colorado River storage project. These rural electric systems located in the States of Colorado, New Mexico, Idaho, Utah, and Wyoming, stand to benefit directly from the low-cost abundant supply of hydroelectric energy that will become available from the project.

Some of these cooperatives purchase their energy from private utility companies at rates ranging up to 12 mills per kilowatt-hour while others are already purchasing energy from Bureau of Reclamation facilities under the terms of the existing wheeling agreement between the Bureau and the Public Service Co. of Colorado. Some of them are paying a premium to obtain service from the Bureau under the Colorado contract.

The cooperatives which lie within the marketing area of the proposed upper Colorado River storage project now purchasing power from privately owned utility systems, would, we hope, be able to obtain Bureau of Reclamation service from the proposed project at substantially lower rates than they now pay. Our systems throughout the country pay an average of 32 percent of their total operating revenue for wholesale power and a substantial reduction in this item of expense would be of inestimable value to our systems in the Rocky Mountain area where population is sparse and construction difficult due to mountainous terrain.

Moreover, those cooperatives that are already supplied by Bureau of Reclamation hydroelectric facilities, either directly or under the terms of existing wheeling agreements, face an acute shortage of power either this year or in 1956. Our systems in Colorado tell us that the Bureau of Reclamation, in contracting power to them from the western division of the Missouri River Basin system, with which

the Colorado-Big Thompson system is integrated, will only contract for their firm power requirements through 1956.

Load growth of cooperatives: The load growth of the rural electric systems within the marketing area of the upper Colorado River storage project is phenomenal. The chart which we presented last year showed that during the year 1952, these systems used 87.84 million kilowatt-hours of energy. To establish some measure of the load growth taking place on these rural systems, we are attaching a similar chart this year showing the comparable figures for 1952 and 1953. The 1953 figures indicate sales by the same cooperatives of 102.75 million kilowatt-hours of energy, representing a load growth of 17 percent within a single year. This means that the total load on these systems will double in about 4½ years.

By contrast, it is generally estimated that total load, urban, rural and industrial, of power companies throughout the country, is doubling every 7 to 10 years. Thus, the interest of these systems in authorization and construction of the upper Colorado River storage project becomes obvious. Our chart shows that on the basis of 1953 consumption, the systems within the marketing area of this project will, alone, save $419,909 per year if they are able to purchase Bureau of Reclamation power from the project at 6 mills per kilowatt-hour, which has been estimated as the firm power rate based on preliminary cost allocations.

In addition to the benefits which will accrue to the rural-electric systems within the power marketing area of the upper Colorado River storage project itself, we are hopeful that power and energy above the needs of the preference customers in that area will be made available to preference customers in other States served by the transmission network of the western division, Missouri River Basin project of the Bureau of Reclamation. These other preference customers also face a serious shortage of power by 1956. To meet the shortage, our systems in Colorado, Nebraska, and Wyoming are planning REA-financed steam generation facilities. The electric capability of these steam facilities can possibly be materially reduced to the benefit of the cooperatives' capital investment in the event that the upper Colorado River storage power is made available to them through the integrated system of the Bureau of Reclamation and the western Missouri River Basin.

Federal transmission—the key to preference: We are very pleased that the present bill, like its predecessors, provide for construction and operation of the project in conformance with the preference provisions of reclamation law, which affords rural-electric systems and public bodies preference in the availability of energy from the project. However, we are alarmed by the implications in the proposal of the private power companies of Colorado that the authority of the Secretary of the Interior to construct transmission lines in connection with the project be limited to backbone tie-lines, and lines not paralleling existing or projected lines of the companies.

Pursuant to this proposal of the power companies, the Department of the Interior, according to the report on House bill H. R. 4449, 83d Congress, 2d session, advised the House committee that it was sympathetic to the private power company proposal. The House committee in turn expressed the expectation that the proposal by the private

power companies for cooperation in the development would be carefully considered by the Department of the Interior, and that the electric power and energy of the project would be marketed, so far as possible, through facilities of the electric utilities operating in the area, provided, of course, that the power preference laws are complied with and project repayment and consumer power rates are not adversely affected.

This language seems somewhat contradictory to the rural-electric systems inasmuch as in many sections of the country our people have been stymied in their efforts to secure their share of power from Federal hydroelectric projects by the refusal of private power companies to work out satisfactory wheeling contracts. In areas where the Secretary of the Interior is not authorized or does not have the authority or appropriations necessary to construct transmission facilities, our systems have not been able to obtain reasonable wheeling agreements for the delivery of Federal power.

It is our contention that any language in the bill itself, or in the committee report, where it would have the effect of conclusively determining Interior Department policy, which restricts the authority of the Secretary of the Interior to construct transmission lines, would be a dangerous precedent and would adversely affect the interests of all the preference customers and of the Federal Government itself.

An absence of authority for the Secretary of the Interior to construct transmission lines, not only to integrate the hydroelectric units of the project, but also to deliver appreciable quantities of the energy produced to the load centers of the preference customers, would vitiate the incentive of the power companies to enter into satisfactory wheeling agreements. Wheeling agreements are generally interpreted to mean contracts by which utility companies, acting as common carriers, transmit power for the account of the Government and without obtaining title to it, to preference customers.

The preference customers remain customers of the Government and do not become customers of the utility companies. We have not been able to conclusively determine whether or not the proposals of the Colorado utility companies would ultimately result in wheeling agreements, or in busbar delivery of Federal power to the power companies, in exchange for promises to deliver a certain amount of the power to the preference customers. The latter is not a wheeling contract.

The Interior Department, in at least one instance, has shown a predisposition to accept a busbar delivery type of contract with respect to sale of Federal power. I refer to the Clark Hill project on the Georgia-South Carolina border.

The authority and ability of the Secretary to construct transmission lines to interconnect the Colorado-Big Thompson project and other units in the western division of the Missouri Basin System has been, we feel, the controlling factor in enabling the cooperatives in Colorado and of other States within the Bureau of Reclamation service area to, in some instances, obtain satisfactory wheeling agreements in areas where the Federal transmission system was not available for delivery of power to load centers of all preference customers.

In addition to the restrictive language contained in the House committee report on H. R. 4449, which was pending before the 83d Congress last year, we would like to call to the attention of the sub-

committee, language contained in the Federal budget for the fiscal year 1956, with respect to Bureau of Reclamation appropriation requests:

> That no part of this appropriation shall be used to initiate the construction of transmission facilities within those areas covered by power wheeling service contracts which include provision for service to Federal establishments and preferred customers, except those transmission facilities for which construction funds have been heretofore appropriated, those facilities which are necessary to carry out the terms of such contracts or those facilities for which the Secretary of the Interior finds the wheeling agency is unwilling to provide for the integration of Federal projects or for service to a Federal establishment or preferred customer.

It is our opinion that this language, emanating from the executive branch of the Government, in corroboration with expressed Interior Department predisposition toward acceptance of the proposal of the Colorado companies, indicates that even with full authority to construct necessary transmission facilities, the Department would be, at the very least, inclined to accept wheeling agreements, and it might go so far as to accept a busbar delivery type contract with existing utility companies, as has been proposed as a means of marketing power from the Clark Hill Dam.

The rural electric systems are not adequately protected, in the sale of Federal power, by agreements which convey title to the output of the projects to private utility companies at the busbar. We feel that such a policy defeats the long-established principle of preference in the sale of Federal power to rural electric systems and other public bodies and places private utility companies in at least a quasi-preferential status.

Transmission protects Federal Government: Moreover, the Federal Government itself stands to benefit from the construction of the necessary transmission lines to integrate the separate units of this project and to integrate the entire whole with the existing Bureau of Reclamation Western Missouri River Basin system. It is our understanding from an examination of the proposed cost allocations for the six large units of the upper Colorado River Basin project that, whereas, these allocations indicate that 74 percent of the total cost of these projects would be allocated to power and 26 percent to irrigation, the fact remains that the entire cost will ultimately be repaid from power sales revenue. The ultimate payout of the project depends on the sale of the project power at the established rate, which we understand to be six mills for firm power.

In the absence of an adequate transmission system, the Government finds itself usually in a position of being able to sell power to only one purchaser, the existing utility company network. The resources of the rural electric systems and other public bodies are generally too small to allow them to construct the necessary high capacity transmission facilities to the Federal dams. Therefore, the Federal Government, in the absence of an adequate transmission system, must dispose of the power at the busbar for what the company will pay. Failure to authorize and build an adequate transmission system would destroy the effect of section 6 of S. 500 which provides for the sale of the maximum amounts of firm power and energy from the project.

The result of insufficient transmission could well be that the actual power sales revenue from the project would be substantially less than

what is anticipated, and whereas the project, in conjunction with an adequate transmission system, would not only be a feasible, but profitable venture, the absence of an adequate transmission system for the disposal of power could make the project appear to be unprofitable in later years. It is our hope that the subcommittee will favorably report the bill with such language as will encourage the Secretary of the Interior to construct sufficient transmission to integrate the separate units and to assure delivery of power from the project to the load centers of the preference customers and to insure the Government of a sound bargaining position in the disposal of all of the energy from the project.

Interest rate in S. 500: The language of S. 500, beginning on page 10, line 3, indicates what we believe to be a departure from existing financing policy. The language says, in effect, that the interest rate applicable to each unit of the upper Colorado storage project and participating projects shall be determined by the Secretary of the Treasury and will be based on the average yield to maturity of all interest bearing marketable public debt obligations of the United States having a maturity date of 15 or more years from issue.

It is our understanding that an overwhelming majority of Bureau of Reclamation projects have been, heretofore, financed at an interest rate of 2½ percent on the investment amortized over a period of 50 years. It is also our understanding from examination of the 1950 Report on the Colorado River Storage Project, that its feasibility is based on a 50-year repayment period with interest on investment at 2½ percent.

Therefore, it seems to us that any financing plan involving a variable interest rate as provided for in S. 500, might change the cost of the project and seriously affect its apparent feasibility during construction or at some future time when some units are finished and others contemplated. Of course, in any estimate of benefits and costs with respect to a public works program, it is necessary to make certain assumptions. One of these is the amortization period and rate of interest to be paid on investment capital. Unless these factors can be fixed, it would be seemingly impossible to arrive at any reasonable basis for estimating the ultimate cost of a project of this magnitude.

San Juan-Chama project: It was our understanding that in testifying in support of legislation authorizing the upper Colorado River project during the 83d Congress, 2d session, that plans for the San Juan-Chama project in New Mexico, as considered at that time, included facilities for the installation of 145,000 kilowatts of power. We note that in S. 500, the San Juan-Chama project would apparently contain no power facilities. We realize this elimination of power at this time was necessary in view of the practical and legal questions involved between those users to the south and others. We are very hopeful that at an early date this matter can be resolved in such a way that power can then be authorized in the project.

Even though there is only one cooperative in northern New Mexico, at Chama, which would be within transmission distance of the power from this project, if we assume the construction of transmission facilities to integrate the entire development, it would seem that the 145,000 kilowatts and 260 million kilowatt-hours per year originally included in the San Juan-Chama project would add considerable

power and energy to the system and provide the Government with revenue which would be unavailable if the power features of this unit are deleted from the bill.

Echo Park Dam: We realize that there has been considerable opposition to the construction of the Echo Park Dam and that this opposition arises from persons and organizations interested in the national parks, and from sincere desires to preserve the natural beauty of such areas. This association, however, has previously gone on record in support of construction of the Echo Park Dam. Our position was, we feel, justified by a study made by the former Under Secretary of the Interior, Mr. Tudor. The former Under Secretary concluded that it was a matter of personal opinion as to whether or not the natural beauty would be harmed by the reservoir inundation, but was of the opinion that the beauty of the Dinosaur National Monument would by no means be destroyed, and he recommended that Echo Park be included in the development plan for the upper Colorado River Basin. Two members of the staff of the National Rural Electric Cooperative Association have also visited the Dinosaur National Monument, and it is their opinion that the water would only add to the scenic splendor and would make certain portions of the canyons more accessible to visitors.

After considering all of the arguments against and in favor of the Echo Park Dam, the 13th annual meeting of members of this association, held in Atlantic City, N. J., on February 14–16, 1955, unanimously passed a resolution in support of the upper Colorado River storage project including Echo Park Dam and including traditional preference rights in the sale of power to rural electric cooperatives and municipal systems together with adequate transmission lines to deliver the power and energy to load centers of the preference customers. For the information of the subcommittee, I am attaching a copy of this resolution.

(The resolution referred to follows:)

RESOLUTION ADOPTED BY THE NATIONAL RURAL ELECTRIC COOPERATIVE ASSOCIATION ANNUAL MEETING OF MEMBERS, ATLANTIC CITY, N. J., FEBRUARY 17, 1955, ON UPPER COLORADO STORAGE PROJECT

Whereas the upper Colorado River storage project proposed for construction in Colorado and neighboring States would bring much needed electric power to the farmers and ranchers of that area; and

Whereas only with such a system of storage and power dams will the waters of the Colorado River be impounded so that utmost use can be made of them; and

Whereas other benefits of such project would be reregulation of the present flow of the Colorado River, flood control, fish and wildlife development, improved recreational facilities, domestic, industrial and irrigation water; and

Whereas there exists in the upper Colorado River Basin great natural resources potential which can only be developed by means of water storage and the electricity produced therefrom: Now, therefore, be it

Resolved, That we endorse the proposed Upper Colorado River storage project, including Echo Park Dam and other dams with full traditional preference rights to rural electric cooperatives and municipal electric systems for purchase of electric power, together with transmission lines to take electric power from electric generation plants on said project to load centers of municipal systems and rural electric systems within reasonable transmission distance of said project, and with transmission interties to the Colorado-Big Thompson system and any other Federal systems.

Mr. FAIN. In summary, I would like to say that the rural electric systems, nationally, and especially those in the power marketing area to be served by the proposed upper Colorado storage project, whole-

heartedly support and urge its authorization provided the power is marketed in accordance with traditional principles of reclamation law, and provided that authorization for an electric transmission network capable of fully integrating the individual units of the project with each other, and the project as a whole with the existing transmission network of the Bureau of Reclamation, and capable of delivering power to the load centers of preference customers, is included. It is our opinion that it will be, as a matter of practicality, virtually impossible for the Secretary of the Interior to market the power from the project in accordance with the mandate of preference law, and in compliance with anticipated power sales revenue schedules designed to pay out the project within a 50-year period, in the absence of proper authorization for adequate transmission facilities.

We also feel that some attention should be given to the language of S. 500 which would depart from what we believe to be a long established Interior Department policy by imposing a variable interest-rate requirement on the funds of the United States invested in the project. In connection with this matter, it is well to recognize that the feasibility studies on this project have, to our knowledge, been based on a repayment period of 50 years and a 2½ percent interest rate in accordance with established reclamation policy.

Moreover, the benefit-to-cost ratio of the project has been calculated over a period of 100 years, according to the 1950 report, which indicates that the Bureau of Reclamation is confident that annual benefits will accrue from the project for a century. The money which is coming into the Treasury during the second half century of operation of the project, will provide an effective net profit to the Federal Government and will, in all probability, dwarf the interest component of repayment during the first 50 years.

In view of the increasing needs of the preference customers in the area, we hope this committee can report S. 500 favorably with language in the report clarifying marketing procedures in terms of traditional Bureau of Reclamation policy.

(The supplemental statement previously referred to follows:)

SUPPLEMENTAL STATEMENT OF CHARLES J. FAIN, LEGISLATIVE ASSISTANT OF THE NATIONAL RURAL ELECTRIC COOPERATIVE ASSOCIATION

Mr. Chairman, members of the committee, this supplemental statement is submitted in view of the proposed amendment offered to your committee by Mr. Moffatt, representing the private power companies in the area affected by S. 500.

The amendment proposed by the witness was as follows:

PROPOSED TRANSMISSION LINE AMENDMENT, COLORADO RIVER STORAGE PROJECT

At the end of section 1 add the following: "*And provided further*, That the authority conferred by section 1 of this Act to construct transmission lines is limited to:

"(1) Backbone transmission tie lines directly interconnecting powerplants in units of the Colorado River Storage Project, directly interconnecting such plants with powerplants of Participating Projects, or directly interconnecting plants authorized in this Act with other Federal powerplants, where such interconnections cannot be more economically and feasibly accomplished through the present and projected transmission systems of electric utilities operating in the States of the Upper Colorado River Basin;

"(2) transmission lines between powerplants of Participating Projects which cannot be more economically and feasibly interconnected by the extension of present or projected transmission lines of electric utilities operating in the States of the Upper Colorado River Basin; and

"(3) transmission lines to municipalities or other public corporations or agencies desiring to purchase electricity and having a preference thereto by law where there are no existing or projected transmission lines which may reasonably be connected with the aforementioned powerplants or interconnection transmission tie lines between said plants, and where the Secretary is unable to contract with electric utilities to deliver such electricity at charges therefor approved by him and by local authorities having jurisdiction.

The amendment proposes to write into the basic legislation authorizing the upper Colorado Project restriction on construction of transmission lines by the Bureau of Reclamation—transmission lines that will undoubtedly be essential in the proper marketing of the power and necessary to give substance and meaning to the sale of this power to preference customers.

The amendment is divided into three parts, the first and second dealing with backbone transmission tie lines interconnecting the projects with each other and also with other Federal power installations. These interconnections are vitally important in properly controlling and integrating the sale of the power. They are also vital in view of section 6 of the bill. However, the amendment language casts considerable doubt on such backbone transmission ever being built, as it proves such is to be constructed only where such interconnections and transmission lines cannot be more economically and feasibly interconnected and accomplished through the present and projected transmission systems of electric utilities.

Such limitations on the Federal Government after building these projects at its own expense are completely unreasonable and against the public interest. An integrated marketing arrangement for the greatest benefit to the Federal Government requires full authority to build whatever lines are needed and not be hampered by proposed lines of the utilities which may or may not come into existence.

The third part of the proposed amendment deals with Federal transmission lines to preference customers. It is here that the proposal endangers the opportunity of the rural electric cooperatives to purchase power directly from the Bureau of Reclamation as they have traditionally done in the past. In the first place, the language used seems to exclude rural electric cooperatives. In the Federal statutes where preference is given to public agencies, municipal systems, and rural electric cooperatives, the latter have always been expressly designated as such. But in this proposal the language is "transmission lines to municipalities or other public corporations or agencies." It is clear that rural electric cooperatives are not municipalities. Neither are they "public corporations or agencies" except in a few States. Therefore, they seem to be excluded by this language.

The next limitation is that lines cannot be built to serve preference customers where there are "existing or projected transmission lines." The same comment here applies as to (1) and (2) above.

There is the further limitation that no such transmission can be built to serve preference customers except "where the Secretary is unable to contract with electric utilities to deliver such electricity at charges therefor approved by him and by local authorities having jurisdiction." In the first place, this limitation is an unreasonable

one because it attempts to give State regulatory agencies power over the Federal Government. This is neither practical nor desirable. Secondly, this language attempts to tie the hands of the Secretary in the enabling act, whereas he should have broad discretion to build such lines as are necessary to carry out the traditional preference clause, and at the same time, protect the Government's tremendous investment in the project, for it must ever be kept in mind that the Secretary must be able to sell the power at a rate which will pay out the projects.

Thus, preference to rural electric cooperatives and feasibility of the projects embodied in S. 500 can be seriously impaired by the adoption of any restrictive language on Federal transmission facilities.

On behalf of the rural electric cooperatives in the area we urge that no such action be taken in regard to S. 500.

Senator ANDERSON. We will recess until tomorrow at 2 o'clock in the afternoon.

(Thereupon, at 12:30 p. m., the committee was recessed, to reconvene at 2 o'clock, same day.

AFTERNOON SESSION

The hearing was resumed at 2 p. m., upon the expiration of the recess.

Senator ANDERSON (presiding). Mr. Bliss? Is John Bliss here?

We will start the hearing this afternoon with a statement by Mr. John Bliss, who is the acting State engineer of the State of New Mexico. I use the term "acting" because I guess it is correct; though Mr. Bliss has been trying to stay out of the job and the Governor has been trying to get him into the job.

We are happy to have you here, Mr. Bliss, to testify.

STATEMENT OF JOHN BLISS, ACTING STATE ENGINEER, STATE OF NEW MEXICO

Mr. BLISS. Thank you, Mr. Chairman.

I merely want to present, if I may, a statement of the chief executive, John F. Simms, our new Governor, in which he fully supports the upper Colorado River project and participating projects, particularly, of course, as they apply to our State.

Senator ANDERSON. Does he follow the same position which Governor Mechem took for the 4 years that he was Governor?

Mr. BLISS. He does.

Senator ANDERSON. Congressman Fernandez is here.

Is there anything further, Mr. Bliss?

Mr. BLISS. I might say, Senator, that I would like the record to show, and I am sure it will, that the evidence presented by the New Mexico group last year is the same this year, and we would like it to so appear.

Senator ANDERSON. Adopted by reference, at least, for this hearing.

Mr. BLISS. I might also remind you that there are, I believe, certain letters from the district to the south of us, in which they are reiterating their statement that—and I refer to the State of Texas largely—with the provision which is now in the bill regarding any transmountain diversion of water to the Rio Grande, if that is unchanged they will not oppose our project.

Senator ANDERSON. Do you have those letters, or does any one have the official letters that they sent in?

Mr. Murphy, do you have those letters that came from the Rio Grande?

Mr. MURPHY. No; I do not, but I will see that they are supplied.

Senator ANDERSON. I will ask that they be put in the record at this point.

(The letters referred to follow:)

LETTERS FROM RIO GRANDE IRRIGATION DISTRICTS

ELEPHANT BUTTE IRRIGATION DISTRICT
OF NEW MEXICO,
Las Cruces, N. Mex., February 17, 1955.

Senator CLINTON P. ANDERSON,
United States Senate, Washington, D. C.

DEAR SENATOR ANDERSON: Thank you for your letter of February 14, 1955, regarding hearings on S. 500 which will begin on February 28. We do not believe that it will be necessary for a representative of this district to participate in the hearings this year.

Very truly yours,

JOHN L. GREGG, *Treasurer-Manager.*

EL PASO COUNTY WATER IMPROVEMENT DISTRICT NO. 1,
El Paso, Tex., February 21, 1955.

Hon. CLINTON P. ANDERSON,
United States Senator,
Senate Office Building, Washington, D. C.

DEAR SENATOR ANDERSON: This is to acknowledge, with thanks, your communication of February 14, relative to the hearings on S. 500, scheduled for Monday, February 28, at 10 a. m.

This is to advise you that I do not wish to be heard, or care to file a statement relative to your bill, S. 500, in case there is to be no change relative to the San Juan-Chama project, as was agreed to last year in S. 1555, between Senator Daniel and yourself.

In the event, however, that any change in the language pertaining to the San Juan-Chama project is contemplated, I desire to reserve the right to either be heard or file a statement before the hearings on the bill are closed.

Sincerely yours,

N. B. PHILLIPS, *Manager.*

Senator ANDERSON. The two letters as I recall them, Mr. Bliss, state that as long as the agreement between Senator Daniels and myself of last year remains in the bill, the people of Texas have no objection, but if it is changed they would like an opportunity to appear.

Mr. BLISS. That is correct.

Senator ANDERSON. Thank you, Mr. Bliss. You may file the letter of Governor Simms for the record.

(The letter referred to follows:)

STATE OF NEW MEXICO,
EXECUTIVE OFFICE,
Santa Fe, February 23, 1955.

Hon. CLINTON P. ANDERSON,
Chairman, Subcommittee on Irrigation and Reclamation, Interior and Insular Affairs Committee, Washington, D. C.

DEAR SENATOR: The development and use of the waters of the Upper Colorado River Basin, including the waters of San Juan River Basin is of vital concern to the State of New Mexico. The use of New Mexico's share of water, as allo-

cated by the Upper Colorado River compact for the development of and benefit to the area by irrigation, municipal and industrial projects, is of paramount importance.

S. 500 has been introduced in the current session of Congress to initiate the development of the Upper Basin. That it includes authorization of the Navaho Dam and Reservoir, the Pine River Extension, and Hammond projects, and provisional authorization for the San Juan-Chama and Shiprock projects is indeed gratifying to this office.

I feel that a great step has been made toward the complete development of the Upper Colorado River Basin with the introduction of the above bill and similar bills in the House of Representatives, and I urge that every effort be made to secure the passage of this legislation.

Yours very truly,

JOHN F. SIMMS, *Governor.*

Senator ANDERSON. You may proceed, Congressman Fernandez.

STATEMENT OF HON. ANTONIO M. FERNANDEZ, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF NEW MEXICO

Representative FERNANDEZ. Thank you, Mr. Chairman.

Anything that I might say would be a restatement of what the chairman and Senator Chavez have been saying, and much better than I could say it myself.

I, of course, am fully in accord with the position taken by Senator Chavez and the chairman on the Upper Colorado River project, and I think I could say that our whole delegation is of one accord.

Senator ANDERSON. Thank you, Congressman Fernandez.

Representative FERNANDEZ. Thank you, Mr. Chairman.

Senator ANDERSON. Congressman Dawson? We are happy to welcome you back to the hearings.

STATEMENT OF HON. WILLIAM A. DAWSON, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF UTAH

Representative DAWSON. Thank you, Senator. I deeply appreciate the opportunity of appearing before the committee.

I have a prepared statement which I would be glad to leave for the record, but in view of the fact that we have so many of our people here from Utah who want to testify and we are so ably represented with Senator Watkins on the committee, I am not going to take the time to read the statement but will insert it in the record.

I would, however, simply like to say this, that I think having gone through this hearing last year and spent the time we have on this project, I can only say that during the intervening time I think it has become more evident than ever that we are in need of this project. Many reasons can be presented, but I am not going to take the time to present them, other than to say that this is vital to the State of Utah. I think out there we can measure our growth by the amount of water we can get and nothing else. We are entirely limited by that factor. And there is not a single thing in the State of Utah today that means so much as this vital project. My only hope is that the people from other parts of the country who perhaps do not realize the importance of water as much as we do can come to understand just how vital it is to us.

So with that brief statement, Mr. Chairman, I again want to thank you for this privilege.

Senator ANDERSON. Thank you.
Are there any questions?
We appreciate the strong support you have been giving.
Representative DAWSON. Thank you.
(The statement referred to is as follows:)

TESTIMONY OF REPRESENTATIVE WILLIAM A. DAWSON (REPUBLICAN, UTAH)

Mr. Chairman, in referring to the four States that would be directly benefited by the Upper Colorado River storage project, the great Daniel Webster once said:

> What do we want with this worthless area—this region of savages and wild beasts, of shifting sands and whirlwinds of dust, of cactus and prairie dogs?

As one writer has commented on Mr. Webster's statement:

> Few men so illustrious have ever proved so wrong on such a tremendous scale so soon.

That Mr. Daniel Webster was proved so tremendously wrong is due in a large measure to contemporaries of his who realized a century ago that the whole Nation had a vital stake in the development of the West.

Congress promoted the West's development legislatively by granting special concessions to facilitate the construction of railroads and encouraging settlement through the homestead acts.

Then in 1902, Congress adopted the reclamation program as we know it today.

I was amazed to learn recently how little has been spent for reclamation in comparison with the benefits returned to the Nation.

Since 1902, only $2.4 billion has been spent on all Federal reclamation. This amount would not finance our foreign-aid program for more than 6 months. And what has been spent on reclamation in the last fiscal year would not have financed our Defense Department for more than 3 days.

The Department of the Interior has furnished me with some rather interesting figures on direct returns from reclamation projects constructed and operating today.

The 29 powerplants now in operation have paid back $226 million net to the Federal Government and during the next 50 years, net income from existing reclamation power developments will return $1.7 billion more. In addition, repayment contracts entered into by farmers and city dwellers who use water from the projects will return another $700 million. This means that the $2.4 billion appropriated will yield a direct return of $2.6 in the next 50 years.

In addition, it is estimated that the Federal income-tax revenues which can be directly attributed to Federal reclamation development already have exceeded $3 billion.

I mention these general facts in speaking about this project because it appears to me that the only valid opposition to this project must come from those who oppose reclamation projects as such.

There can be no dispute that we in the Upper Colorado River Basin have the right to use the water. That was guaranteed to us in 1922 by solemn treaty approved by the United States Senate.

There should be no dispute over the feasibility of this project. We have expert testimony that the cost of construction will be repaid—with interest on the power and municipal features within the regular 50-year period.

There can be no dispute that the people of these four States need the water and there can be no dispute that now that water—that belongs to them—is flowing to waste in the Gulf of California.

This project has been studied more thoroughly and at greater length than most of those that Congress has authorized in the past. It represents the culmination of years of effort and planning.

That this is the last major river basin to be developed is ironical in itself. The Colorado River flows through the most water-starved States in the Nation. It has some of the greatest damsites in the world. It is certainly time now for Congress to take action to bring to the Nation the wealth that the harnessing of this river and the use of its water will produce.

Senator ANDERSON. Congressman Thomson of Wyoming.

STATEMENT OF HON. E. KEITH THOMSON, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF WYOMING

Representative THOMSON. Mr. Chairman and members of the committee, I also appreciate this opportunity to appear before you and the courtesies you have extended to me during this hearing——

Senator ANDERSON. We are very glad to have you.

Representative THOMSON. — while I have been familiarizing myself to a greater extent with the project.

I have a prepared statement here, and in the interest of time I do not think I will read it, but I would like to leave it with the committee.

Senator ANDERSON. If you want to read it, you can, and if you want to leave it with the committee, we will be happy to receive it.

Representative THOMSON. It is not too long, so perhaps I can go ahead and read it.

Mr. Chairman and members of the Senate Interior Committee, I want to thank you for this opportunity to appear and make a brief statement on the upper Colorado River development.

I do not intend to go into the technicalities. I know you have heard, or will hear, many well qualified experts, both from the Bureau and from without, to satisfy you as to these aspects. I am particularly pleased that outstanding authorities and citizens of Wyoming could appear either at this or previous hearings. Many of them have devoted a great deal of their time to the project over a period of many years. I do not want to burden you with cumulative testimony. Because of these factors, I would like to limit my statement to a few unrelated remarks.

This development is, in my opinion, of particular importance to Wyoming and other States in the area, and of general importance to the Nation as a whole. It is vital to our continued growth, prosperity, and progress. We are one of the best markets for much of the rest of the country at a time when it needs to develop markets. As our population grows, experience has proved that many sons and daughters will be looking for a new home in our area. The general area has often been referred to as the treasure chest of the Nation because of its coal, iron, timber, and other resources. Only recently the attention of the

Nation has been directed to this section because of the search for uranium. The availability of our natural resources may be vital to the Nation's security. Yet those of us who best know this area well realize that our most precious resource is our water. As people in other areas, with a more fortunate water situation, exhaust the ready supply, they will come to appreciate this fact. It is essential if we are to develop and make available our other resources. We must develop it, use it, and reuse it, if our supply is to be adequate. Development necessarily means adequate storage in this semiarid area. This project would provide a large part of the storage, and some of the development.

Wyoming has not rushed blindly into these projects. We have learned from bitter experience that development is not justified unless it will create successful farming units. That participating units in Wyoming will be successful has been proved by the Eden project which has served as a pilot operation.

Supplementary water furnished to some lands already under production, but without an adequate water supply, is equally important with the new lands to be irrigated. This will furnish the plus that will permit the economy of these units to be stabilized. It is the plus which causes our economy to grow on a firm basis.

This is not a request for a gift, all but about 3 percent charged principally to recreation will be repaid to the Federal Government, and, to a large extent, with interest.

Speaking of recreation, the principal argument used by the opponents of the project seems to be that construction of Echo Park will create a precedent for invasion of our national monuments and parks. Of course, everyone who is informed realizes that this is not the fact. The Executive order enlarging the national monument specifically provided for reclamation withdrawal. There would be no precedent as to other monuments and parks which had no such provision made in connection with their establishment.

As to the recreational benefits, not only to ourselves but to the country as a whole, may I point out to you that recreation is one of our principal businesses. Increased recreational opportunity is one of the factors that causes a large segment of our population to be so enthusiastic about the development. They have made a large investment in motels, hotels, and other accommodations for tourists. They have made a thorough investigation, as only one does who is protecting an investment and a livelihood. I am sure that as you consider all of the testimony, you will reach a conclusion with them that the recreational advantages will be increased with construction of the project.

I would also like to emphasize to you the contractual obligations involved. These are not only contractual obligations between the upper and lower basin States, but are contractual obligations to which the Congress itself is a party. Congress has approved the Colorado River compact. I am sure that this was done by all parties in good faith, and that they will respect their obligations. The upper basin States have in good faith cooperated in making possible the development of the lower basin to the end that that basin is to be to a large extent fully developed. Now that the time has come for the development of the upper basin, I am confident that the lower basin States themselves, as they reflect upon the situation, and particularly this Congress, will recognize its obligations to make possible that development. I am sure that the testimony that you will have before you

will convince you, just as it has convinced me, that by construction of the necessary storage facilities, the lower basin States can be assured the water due them, and the upper basin States can have the water necessary for their development.

I would also like to emphasize the contributions that Wyoming in particular has made to the reclamation fund. According to information recently furnished by the Bureau of Reclamation, the total accretions to the fund as of June 30, 1954, amounted to $376,850,116.51. Of this amount, $336,631,595.04 comes from sale of public lands, and from oil and gas rentals and royalties. The difference of approximately $40 million is not allocated by States, but almost $30 million of it represents receipts from naval petroleum reserves. The States of California and Wyoming have contributed all of this. Although I have not, as yet, been able to obtain a breakdown between the two States, I am confident that Wyoming has contributed a substantial portion. We need only to recall the Teapot Dome to substantiate this.

Of the $336 million plus from sale of land and oil and gas rentals and royalties, our State alone has contributed over $101 million or almost one-third. Of the $336 million plus, $215,520,551.07 is from oil and gas rentals and royalties. Of this sum, Wyoming has contributed $91,881,844.66, or over 42 percent. Wyoming continues to be the big contributor to this fund, its contributions increasing year by year. Its contributions for the calendar year 1954 amount to almost $10¼ million. I have not, as yet, been able to obtain complete or comparative figures on benefits received under the program. I have proceeded far enough, however, to know that total construction for the benefit of Wyoming probably does not exceed our contributions. I am sure that you will agree with me that we are certainly in a position to ask that these projects, which will benefit a large section of our State, be given favorable consideration.

I have always believed that sound Government practices should cause public projects to be built during times when the employment and expenditure will be of the greatest benefit to the economy. Contrary to general business conditions, the economy of a large part of this area is seriously depressed at this time because of the closing of the coal mines with consequent unemployment. This certainly indicates that the time for construction is now. This will provide for the transition period to allow for the development of other resources. As the men are no longer employed in the construction phase of the projects, I am confident that jobs in private industry will again be available to them in this area.

I am confident, too, that when you have thoroughly examined all of the witnesses, and considered the testimony, you will recognize the desirability and necessity of the upper Colorado River development.

I again want to thank you for this opportunity of appearing before your committee. Your favorable consideration is vital to the future of our area, and to the future generations of America.

Senator ANDERSON. Incidentally, I would not want to make it appear that I was discriminating, but Congressman Dawson has been here several times in these hearings and is an old and true friend of the project, and therefore I thought I would make some differentiation.

Representative THOMSON. There is only one thing I would like to emphasize, and that is that the time to make public improvements, other things being equal, is when you need a little bit of stimulation.

Contrary to other sections of the country in the general condition, in this particular area due to the fact that these coal mines have been shut down, we now find ourselves in a temporarily bad economic situation, with men out of work.

Senator WATKINS. That is around the Rock Springs area, is it not?

Representative THOMSON. Around Rock Springs, and I have a brother in law that is down in Paonia, Colo., who is in the coal mines down there. I know of their situation. It is generally true of that high priced coal area there.

Senator ANDERSON. That is true of our State.

Representative THOMSON. I think it is, yes, Senator. So that means that it is something that should be done now.

Thank you very kindly.

Senator ANDERSON. Congressman Dixon?

We are very happy to welcome you, too. We are pleased indeed that you could be here and be with us today.

STATEMENT OF HON. HENRY A. DIXON, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF UTAH

Representative DIXON. I appreciate the opportunity.

I would like to talk for about one minute and then have the privilege of inserting my remarks in the record.

Senator ANDERSON. You have a great deal of experience with the agricultural problems of that part of the world, do you not?

Representative DIXON. Yes. I was president of the Utah State Agricultural College until the first of this year.

Senator WATKINS. We drafted him, Mr. Chairman.

Senator ANDERSON. I understand the circumstances, yes, indeed.

Representative DIXON. I have great faith in this project, because I have heard experts in our college and from the other land grant colleges certify as to its desirability and its validity.

I have seen Olie Larson here at work over a period of 48 years, and he has never made one failure. George Dewey Clyde was the dean of our school of engineering. He is revered all over the West. They are men whose judgments you can trust. So there is nothing phony about this project.

I would like to say that the Utah State Agricultural College board of trustees is 100 percent in favor of this; and now I learn that even the student bodies from the higher institutions of learning in Utah are starting a big upsurge for it, because they figured that this will open the door of hope to those young people. And there is not much opportunity without it.

In my associations with the presidents of the other land-grant colleges in all those western States, I am sure that they are praying for an opportunity for their youth in the same way.

Now, if I might extend my remarks for the record, I would appreciate it.

Senator ANDERSON. How long have you been interested in agricultural work?

Representative DIXON. Well, I farmed with Senator Watkins. We raised 21 carloads of peaches off our 1 orchard. And then I was in the

agricultural college for 2 years, and in another college, Webber College, for 18 years.

Senator ANDERSON. I was merely trying to qualify you as an expert.

Senator WATKINS. Mr. Chairman, may I ask him this question:

You have been identified with business and banking as well as in the teaching field, have you not?

Representative DIXON. Yes, I managed a bank at Provo, Utah, for 8 years, and I knew the farmers' financial conditions during the depression and their problems.

Senator WATKINS. This bank was called the Farmers and Merchants Bank, I want you to know.

Senator ANDERSON. Any questions, Senator Kuchel, or Senator Watkins?

Thank you very much.

Representative DIXON. Thank you, Mr. Chairman.

Senator ANDERSON. Mr. Zimmerman?

I think it is unnecessary to say for the record that Mr. Zimmerman has been for many long years identified with the Bureau of Indian Affairs and is recognized as a great authority on Indian matters. Personally, I am happy to say he is an excellent book collector and now is engaged in working with an Indian association.

You may identify yourself, Mr. Zimmerman, and particularly identify the Indian organization with which you are identified.

STATEMENT OF WILLIAM ZIMMERMAN, APPEARING ON BEHALF OF THE ASSOCIATION ON AMERICAN INDIAN AFFAIRS

Mr. ZIMMERMAN. Mr. Chairman and gentlemen of the committee, my name is William Zimmerman. I appear here on behalf of the Association on American Indian Affairs, which is the successor, by change of name and merger, of two organizations organized originally in 1922 and 1923.

I point out, not for Senator Anderson's benefit, that the president of the association is Mr. Oliver LaFarge, who is a resident of Santa Fe.

My testimony, Mr. Chairman, will be limited to a single project, which I believe ought to be included in the upper Colorado plan. This is the Shiprock or sometimes called the San Juan Channel project. Its primary purpose, as I see it, is in the development of land for irrigation of a large acreage on the Navaho Indian Reservation.

President Eisenhower, in his message, submitting the upper Colorado plan, omitted this project without prejudice, indicating that more study was desirable. As late as last week, on February 25, the Department of the Interior, in a letter to Senator Murray, still stands on the same ground, that more study is needed.

Now, having been on the other side of the fence, gentlemen, I think you will appreciate that I say with some hesitation that I think the bureaucrats have had ample time to study this project. The first engineering report was made in 1901, by a local engineer, J. Turley.

Senator ANDERSON. His father operated Turley's Mill up in the Farmington area, 70 years ago, and Mr. Turley was probably the first engineer who went over the route of the transmountain diversion, and gave me a story on it which I printed in a newspaper in 1918.

Mr. ZIMMERMAN. I never met him.

Senator ANDERSON. Of course, I was a small boy at that time, but I recall the incident.

Mr. ZIMMERMAN. You have the advantage of me. He was only a name to me.

But since that time, there have been many other surveys made, several New Mexico State engineers have made surveys of the project, the Bureau of Indian Affairs has made several, and more recently the Bureau of Reclamation has made several.

Soil surveys were made, I believe, both by the Indian Bureau and by Reclamation. Dam sites were started and core drillings were made.

Of course, each new survey that was made involved a complete reappraisal of all the prior surveys that had been made.

It is my candid opinion that the Department has all of the possible data bearing on the costs and the feasibility and the desirability of this project that can be had. I am very fearful, Mr. Chairman, that further study is possibly a euphemism for someone's unwillingness to make up his mind.

Senator ANDERSON. I do think, Mr. Zimmerman, in fairness to the Department of the Interior, that I believe the Bureau of Reclamation has now finished its studies on the Navaho Dam and the Shiprock project and has a feasibility report ready showing the project is feasible, but the law requires a period of study inside the Department and a 90-day period in which that can be submitted to the States. And I think we are right in the process now of submitting it to the various States. As far as the actual engineering work is concerned, I think Mr. Clyde and his staff have completed that part of it, and Mr. Larson and his group have passed upon it.

If I am incorrect, I would be happy to be corrected.

But at least the project is now in Washington, and we hope it will soon be out in such shape that the final reports will be completed. It involves more than 100,000 acres of land, and therefore it does require a period for study on the part of the various affected States.

But I agree with you that we are all anxiously awaiting the final report.

Mr. ZIMMERMAN. I am, frankly, very fearful that if this project is not included at this time, it may be a long time before it is considered. I fear that if this bill passes without the inclusion of this project, it would be very difficult to get reconsideration for it.

Senator ANDERSON. I could not agree with you more. I think it is absolutely imperative.

What does this project mean to the Navaho Indians, Mr. Zimmerman? You have been familiar with their problems and their difficulties for a period of 40 or 50 years. What does this mean to them?

Mr. ZIMMERMAN. Well, I would like to speak to that point, Mr. Chairman.

This project is the keystone of the Navaho rehabilitation program. It is the largest single item in that program, both in terms of money and in terms of people who would be immediately affected. Certainly a minimum of 2,000 families, perhaps a maximum of 3,000 families, could be successfully located on this irrigable land. The various figures, of course, I need not explore here, but it depends on the character of the land and on certain taxes, whether the project ultimately is restricted to gravity flow, or whether there is pumping

involved. But even if nothing but gravity irrigation is used, I believe a minimum of 2,000 families can be provided for on that land.

Senator WATKINS. That would be about how many Indians?

Mr. ZIMMERMAN. Somewhere around 10,000 Indians. The average, I think, would run a little higher than the 5 per family.

Senator ANDERSON. That is 10,000 Indians on the land as farmers?

Mr. ZIMMERMAN. As farmers.

Senator ANDERSON. And in addition to that?

Mr. ZIMMERMAN. In addition to that, as you well know, there would be many secondary benefits. Two thousand families engaged in farming would require—the reclamation experts will correct me, please—certainly as many people as could be supported in dependent industries and business and occupations that contribute to the success of the farming enterprise.

There would be some other secondary benefits. The relocation of that number of Navahos in a reasonably compact area would have a great impact on the whole economy of the region. It would remove the pressure, first, on certain areas from which the 2,000 families would be removed. It would also make, I think, for savings in Government expenditures, and the concentration of population in that way would reduce the cost of providing schools, medical care, and various other Government services. It would be much cheaper to provide those for a concentrated population than for a population scattered as widely as the Navahos are in the main.

Senator WATKINS. Is it not a fact, Mr. Zimmerman, that Congress has already passed an act authorizing expenditure on a 10-year period of around $88 million for the rehabilitation of the Navahos, and that part of that money could be used, if we could get this project going, to put these people on the farms and help them get established?

Mr. ZIMMERMAN. In 1950, Senator Watkins, as you know, Congress passed the Navaho-Hopi rehabilitation bill. That had one item in it. In section 1 there was an authorization for completion and extension of the existing irrigation projects, and also for the completion of the investigation, to determine the feasibility of the proposed San Juan project. That authorization was for a total of $9 million.

So I think Congress has recognized at least the need for the determination of feasibility.

But there is plenty of other statutory authority, I think, Senator.

Senator WATKINS. I think there is still more of that money to use if necessary.

Mr. ZIMMERMAN. That is right.

Senator ANDERSON. Mr. Zimmerman, the Navahos have been demonstrating, have they not, quite a little interest in developing industries of their own, such as the sawmill, tourist courts, and various things they have gotten into recently? Would that not indicate that they have a probable capacity to farm these lands successfully?

Mr. ZIMMERMAN. Oh, I think they show that also by their success on the smaller irrigation projects that are now there, particularly in the Shiprock-Farmington region.

Senator ANDERSON. And then many Navahos have gone out to the project in Colorado and done well out there?

Mr. ZIMMERMAN. That is right. They have relocated out there. I think their success in running trading stores and some other industries is an indication of adaptability. I think, although most of them

still run sheep, they take to farming, and most of them do well at it.

Senator WATKINS. The building of this project would relieve the range pressures, would it not?

Mr. ZIMMERMAN. I think it would be a very material change, Senator Watkins.

Senator WATKINS. As it is now, it has been necessary at various times to curtail the use of the range to cut down the size of the flocks.

Mr. ZIMMERMAN. That is true.

Senator WATKINS. And if they had this project underway and the additional fodder could be grown there, it would be a big help.

Mr. ZIMMERMAN. Yes. And these families who gave up their rights on the range to accept irrigated lands of course would provide that much additional expansion possibilities for the families who elected to continue to run sheep. But it seems to me this is the most important single item in the whole rehabilitation program.

Senator WATKINS. I think I would agree with you. As one of the authors of the bill, I think it is highly important. It would give a great lift to those Indians, a great upsurge for their final development.

Mr. ZIMMERMAN. I would like to speak about only one other point, Mr. Chairman, and that is this matter of water rights.

I would like to point out that the Navahos do have certain prior water rights, perhaps undefined and undetermined. But under existing law and under existing court decisions, they do have certain priorities.

I believe that the trustee has an obligation to see that those water rights are preserved, and if they are lost I would expect, frankly, that the Navahos would ultimately sue the United States for a large sum of money, because those water rights were not made available to them.

Senator ANDERSON. Would the passage of this legislation and the final construction of the Navaho project, including the dam and the one part that used to be called the old Shiprock project, help to confirm and carry out the obligations and rights that the Navahos had?

Mr. ZIMMERMAN. Oh, yes. If the water is put to beneficial use, I think there is no question but that their right would be confirmed.

Senator WATKINS. What I am trying to ask is: The passage of this legislation would not jeopardize those rights, but would actually carry out the promise implicit in those rights?

Mr. ZIMMERMAN. That is quite right.

That is all I have to say.

Senator KUCHEL. Just on that point, Mr. Zimmerman, is it the position of your association that the Navaho Indians have a prior or, if I may use the word, a paramount right to the waters on the Colorado River?

Mr. ZIMMERMAN. Not to all the waters; no, sir.

Senator KUCHEL. All right. To the extent that they can make reasonable beneficial use of the water?

Mr. ZIMMERMAN. Yes, sir.

Senator KUCHEL. Is that your position, or the position of the association, with respect to the other Indians who have lived along the Colorado River?

Mr. ZIMMERMAN. I may say yes, it is our position, but I think it is really the position of the courts, laid down initially in the Winters case.

Senator KUCHEL. So that it is your view and the view of your association that the Indians in the Colorado River Basin have a first claim to waters of the Colorado River to the extent that they can use them to their own beneficial interest?

Senator WATKINS. Well, may I answer this? I specifically was asked as to the waters that would be affected by this project. My understanding is that no waters are to be taken from any of the other States. These waters that would be used on the project come from waters allocated to the State of New Mexico.

Senator KUCHEL. You are talking about the Shiprock project?

Mr. ZIMMERMAN. Yes, sir.

Senator KUCHEL. But assume Indians in any other area, lower or upper basin. I am just wondering as to your position as to their rights irrespective of the Shiprock project.

Mr. ZIMMERMAN. To me as a layman, when the United States established a reservation for Indians the presumption was that it reserved to that reservation enough water to irrigate whatever land was irrigable. That, at least, as I understand it, is the essence of the Winters case.

Senator KUCHEL. Has that been the position of the Federal Government?

Mr. ZIMMERMAN. As far as I know, it has generally been the position; yes, sir.

Senator KUCHEL. That is all. Thank you, Mr. Chairman.

Senator WATKINS. And the Indians up in the Utah area, among the Uintahs and Whiterocks and those other Indian tribes in northeastern Utah—their rights have been pretty well taken care of under the canal systems that have been built, and water is being put to beneficial use there at the present time?

Mr. ZIMMERMAN. I think so.

Senator WATKINS. That is, of course, water out of the Colorado River or one of its tributaries.

Senator ANDERSON. Thank you very much, Mr. Zimmerman.

Mr. ZIMMERMAN. Thank you, Mr. Chairman.

Senator ANDERSON. Now, I think we have two different presentations with reference to the Gooseberry project.

Mayor Welsh, may we start with you?

STATEMENTS OF MAYOR WILLIAM J. WELSH, JR., JOHN BENE, AND ERVIN GERBER, OF PRICE, UTAH; AND MAYOR S. J. DIAMANTI, OF HELPER, UTAH

Mr. WELSH. Mr. Chairman and gentlemen of the committee, my name is William J. Welsh.

Senator ANDERSON. Would you also like to put into the record the names of the individuals with you here today?

Mr. WELSH. Those in attendance with me are Mr. John Bene, the county engineer, Mayor Steve J. Diamanti, of Helper, Utah, and Mr. Ervin Gerber, who is the president of the Price River Water Conservation District.

Senator WATKINS. Mr. Chairman, I would like to say these gentlemen come from one of our great resource areas, that has immense coal and oil shale deposits. They have large cattle and sheep operations. It is one of the most prosperous areas of Utah. They have a point of view to present, and I think some other citizens of Utah will present another phase of this same project.

We are very sorry, the Utah delegation is, that we have not been able to work out an agreement, and the delegation will have to take its stand on this matter as it sees fit under all the circumstances.

Senator ANDERSON. I asked about it earlier today, and they said, "Yes, we are all in harmony, but it is a sort of a divided harmony." We are happy to have the two sides of the harmony presented to us.

Go right ahead, Mayor Welsh.

Mr. WELSH. Thank you, Mr. Chairman.

First, I would like to present to you a letter from the county commissioners of Carbon County, addressed to the Committee on Interior and Insular Affairs, regarding their position on the inclusion of the Gooseberry project in the upper Colorado River storage project.

Senator ANDERSON. Would you state the contents, briefly, of the letter? Then we will put it in the record.

Mr. WELSH. Briefly, sir, their position is that they are opposed to the construction of the Gooseberry Dam as it is presently set up, by a tight dam. It recites in the letter the facts of area growth in the county, the fact that we have used the water for the last 75 years or from the time of the settlement of the valley.

They also state their position as favoring the enactment of the upper Colorado River storage project.

However, they are unalterably opposed to the inclusion of the Gooseberry project in that overall program. And I should like to present this to you.

Senator ANDERSON. The letter will be put in the record at this point.

(The letter referred to follows:)

CARBON COUNTY,
Price, Utah, February 25, 1955.

COMMITTEE ON INTERIOR AND INSULAR AFFAIRS,
United States Senate, Washington, D. C.

HONORABLE SIRS: The Board of County Commissioners of Carbon County, State of Utah, wish to be on record as opposing the inclusion of the Gooseberry project as a participating project in Colorado River storage project. This project would deprive the residents of Carbon County of a large portion of their decreed water rights, which have been in use for the past 75 years.

During the period between 1940 and 1950 the population of Carbon County increased from 18,459 to 24,901, or 25.87 percent, and the municipalities of the county are already experiencing an acute water shortage for culinary use and the problem of securing sufficient water for additional industrial expansion is very serious, as the county economy is based on farming and the coal-mining industry and other industry is needed for proper balance of working force.

If the Gooseberry Dam is built as presently set up, by a tight dam, it will deprive Carbon County water users of the most important source of spring and summer runoff, and seriously impair the decreed rights of primary water users and the equalizing of storage in the Scofield Reservoir.

The people of Carbon County favor the enactment of the upper Colorado River project, but are unalterably opposed to the inclusion of the Gooseberry project, and for this reason, the county has not appropriated money to the Utah Water and Power Board, which has been active in promoting the Gooseberry project, and we wish to correct the record against any misrepresentation by the water board in this matter.

Respectfully submitted.

BOARD OF COUNTY COMMISSIONERS,
By B. H. YOUNG, *County Clerk.*

Senator ANDERSON. Did I understand you to say that you had been using this water for 75 years?

Mr. WELSH. Yes, sir.

Senator ANDERSON. You have a pretty well established right to it, have you not?

Mr. WELSH. That apparently is the point of conflict. It is one basis of it. I think we can perhaps cover that point in a few minutes.

Senator ANDERSON. Thank you.

Mr. WELSH. I do not have a prepared statement to submit for the record, so I will use some notes and speak on it extemporaneously if it is all right with you.

The Gooseberry project, as is indicated on the map here, is a transmountain diversion, with no exchange of water involved with our area.

In going into the history of the situation, we find that the valley was first settled in January of 1879, when the first pioneers settled along the river banks in the vicinity of what is now the city of Price, which is the largest city in all of southeastern Utah, an area that is comparable in size to about two-thirds of the State of Pennsylvania.

The early economy, of course, was agriculture, and that was, the basis of the economy, and the water was used for those purposes, and of course for an expanded purpose.

Early in the history of the valley, the storage of water became a paramount necessity, and the formation of irrigation districts consolidated the farmers of the area when in 1906 they constructed what is now known as the Mammoth Dam, at the Mammoth Dam site. This is the same site at which it is now proposed to build the Gooseberry participating project, to divert over to an area known as the Sanpete County.

Senator ANDERSON. I am sorry. Could you tell us just a little more about the Gooseberry project? Are there water users now receiving water from this particular area, and is it proposed to build a dam and divert that water to somebody else?

Mr. WELSH. Yes, sir. Very briefly, the water is on the Carbon County watershed, which is in the upper Colorado River Basin. That is proposed to divert 12,000 acre-feet of water by means of a tight dam and approximately a two and a half mile long passage through the tunnel to the west and into the Great Basin.

The purpose of the water, as I understand it, is a supplemental supply to about 16,000 acres of land in Sanpete County.

Now, in all fairness, I think it is known that the area to be irrigated, while it is a supplemtal supply, is now receiving a partial supply.

Senator ANDERSON. From this same source?

Mr. WELSH. No, sir, from their own watershed.

There is a mountain that rises up between the two counties, that acts as a physical barrier, that completely separates us economically, commercially, and culturally. This barrier is about 9,500 feet. It is very good deer country.

The diversion has been talked about for quite a number of years. Part of the line of Sanpete County falls down just a little bit below that ridge that is indicated on your map there. That is the Colorado River Basin Divide. And their county line, as I understand it, is just slightly below the ridge. The two county lines are adjacent.

Now, that is approximately the situation. They have never used the waters from the Carbon County watershed, nor has their economy ever been based on it.

Senator ANDERSON. May I ask another question? You say that that is going to be brought across that diversion and will irrigate, as I understood it, about 16,000 acres?

Mr. WELSH. That is my understanding of it, sir.

Senator ANDERSON. Will it take any water away? Will it stop the irrigation of any water on the other side?

Mr. WELSH. On our side?

Senator ANDERSON. Yes.

Mr. WELSH. That is our contention. We presently have under irrigation about 15,809 acres that are included in the irrigation district, or the Price River Water Conservation District.

Senator ANDERSON. Do you mind my breaking in?

Mr. WELSH. No, sir. You go right ahead.

Senator ANDERSON. I am sorry. I was trying to get an understanding of it.

Mr. WELSH. The proof has been made on 16,803 acres on the Price River Water Conservation District. However, at the time a tripartite water agreement was enacted between the Department of the Interior, the Price River Water Conservation District, and the Carbon County Water Conservancy District, it was visualized that perhaps part of this water might be surplus.

Now, this contract was enacted in the year 1943—October 11, 1943. It involved, on our part, the construction of a structure that is known as the Scofield Dam.

Now, the present structure has a storage capacity, active storage capacity, of 65,000 acre-feet of water.

The reason why the new and rebuilt structure was put up there is because of the failure of the original Scofield Dam, which was built in the year 1928. That structure had a partial failure, and the State engineer, as a matter of fact, condemned the structure and limited its storage to 30,000 acre-feet, and for a great number of years our people were forced to get along on the 30,000 acre-feet of storage. The original amount of the active storage capacity of the original dam constructed in 1928 was 61,000 acre-feet of water.

Surveys have been made a great number of times in the area with regard to the agricultural use of water.

Now, I should like to point out at this time that the records of the Bureau of Reclamation contained in their planning report No. 50A, dated March 1943 and revised as of May 1944, indicate that the only surveys that were conducted with regard to the usage of water in our area in Carbon County were on the basis of agricultural use.

You will find in the examination of all water filings on the area that the only types of filings that exist on that watershed are for agricultural purposes. The Bureau of Reclamation Planning Report No. 50A also indicates that there have been no reservations at all made at least up until the time of this report, and no demands have been made for reservation of flow for municipal water supplies or other uses.

Now, a certain group of people within the county, that is, the farmers themselves, as you can see, control all of the water, and the basis of the demand for water, for instance, from municipal supplies,

in the case of my city and in the case of Mayor Diamanti's city of Helper, are such that people in years gone by have purchased primary water from individuals who own certificated rights in various counties in the area. For instance, my city owns the right of use, I should say, to 11 second-feet of water in 4 different canal counties. We have no filings of our own with the exception of one filing of 5,000 acre-feet of water on the White River, which is a tributary to the Price River. Naturally, sir, we are in need of some additional water to take care of the growth that we have experienced and the anticipated growth that we hope will come along.

It is also rather interesting to note that the actual usage, the amount of water diverted into the canals over the last 10-year period, by actual measurement of the river commissioner, who is a deputy of the Utah State engineer, indicates that we have been using 68,000 acre-feet of water annually.

Also, I should like to point out that out of the 16,803 acres that were filed in the proof, only 11,000 acres have only storage rights that are impounded on the Scofield Reservoir, and 5,803 acres have some primary water and use reservoir water as a supplemental supply to mature late crops.

We also have the problem coming up before us and existing right at the present moment that industrial users are limited in supply at the present time, with the exception of the D and RG Railroad and one of the major coal companies in the area, who have a decreed continuous water right in the Price River. New industries established in the area have not acquired any water rights.

The usage of water, as it is in many other areas in the Far West, is very high, because of the arid climate and the small amount of precipitation that falls during the year. Naturally, most of our communities, or some of them, including my own, have been in short supply of water, and restrictions have been placed in effect to curtail the general use of water in many instances.

We have tried to exhaust all possibility of any future development of water. We know that with the anticipated activity in the securing of water, my city and the city of Helper have caused a geological survey of the water in the valley to be made by Dr. Ray Marcel of the University of Utah, and we have retained him on the basis of giving us data regarding the underground sources of water. His report to us states that due to the mica shales in the valley and Carbon County, the source of water would not be available for municipal purposes due to the tightness of the structure.

The county into which it is proposed to divert this water has a population of 13,891 people, according to the 1950 census, in an area of 1,616 square miles. The total assessed valuation of that county is about $13 million.

The use of the water in its present drainage is the backbone of the economy of 24,901 people in the 1950 census who live in Carbon County. This county has an area of 1,487 square miles and has an assessed valuation of $30,500,000.

The economy so established is such that the people enjoy the highest per capita family income of any area in the State of Utah. It is interesting also to point out that a survey of the residents of Price City indicates that they have a lifetime earnings of $137,000, as compared to $114,500 for the other areas of the State of Utah.

Total payrolls in the area, including income from the coal mines, amount to about $25 million a year. Just before leaving for Washington, I checked with the county agricultural agent, and asked him if he could give me an estimate as to the cash income from crops grazed in the county for the year 1954.

The amount given to me was $973,310. With the livestock industry included, our cash income from all sources of agricultural pursuits brings in excess of $3 million per year.

The question is, What effect will the proposed diversion have on the economy?

Due to the nature of the diversion, it will reduce the agricultural acreage as well as livestock and crop production by approximately 30 percent.

Naturally it will limit the industrial, culinary, and other uses to our economy of water as it was in 1944, when survey planning report No. 50A was finalized.

In other words, by making the diversion on the basis of the survey, it would tie our economy down to that period forever. It would absolutely curtail the future growth and expansion and reduce our standard of living. The effect of this might be realized when it is pointed out that the area is aggressive and progressive and has sought and obtained many improvements.

Carbon County showed a growth in population during the years 1940–50 of about 25.8 percent, while the entire State population growth rate was 25.2 percent.

The water to be diverted is now being used beneficially, and if diverted, would cripple the area for any future growth.

As Senator Watkins so aptly pointed out at the beginning of our hearing, the area has developed a vast coal-mining and coal-processing industry during the past 50 years.

Needless to say, when you hear someone speak of the vast coal reserves in the State of Utah they are talking about my county. The reserves are so vast that it is estimated that this area alone could supply the needs of the entire United States for the next 100 years.

The coals have good physical and chemical characteristics, and those that are not suitable for coking are high in volatiles.

Since the let down of some of the coal production due to the economic conditions immediately prevalent at the end of the Korean war, we have sought to diversify our economy and have been concentrating and leaning toward the synthetic liquid fuel industry and toward the chemical industry, where coal plays a vital part. Of course, to operate these industries requires a certain amount of water.

The present coal-mining operations include the domestic and captive mines. The two mines at Sunnyside, Carbon County, Utah, produce coal and coke exclusively for the Kaiser Steel Co. at Fontana, Calif. The Geneva Steel mines at Horse Canyon and Columbia produce coal exclusively for the largest steel plant west of the Mississippi, that is, the Geneva Steel works at Geneva, Utah, and furnish the entire production needed by that facility for coking.

As a consequence of the value of the coal this company has programed $18 million for expansion of their plant facilities to produce commercial fertilizer as a bypproduct of the coal.

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Naturally we point with pride to the fact that we believe we are ideally situated for several types of advancement. We have natural resources of coal and shale in vast quantities, together with deposits of titanium, gallium, and germanium in commercial quantities. A new gas field has been brought into production, and it is programed to have 10 or 12 drilling rigs in the area to further the exploration and development of natural gas and oil this coming summer.

We have experienced a great deal of uranium activity, and together with Grand Junction, Colo., and Moab, Utah, share in that industry to a great extent.

Another feature that might be worthwhile pointing out to you is the fact that as a result of the continued good prospects of the area, the Utah Power & Light Co., the major utility in the State, has just completed and put into operation a new $11½ million 66,000-kilowatt-hour powerplant at Castle Gate, Utah. This is a mine-mouth steam-generated plant and has proven to be very efficient and workable. It is our understanding that this utility plans on adding 2 new 75,000-kilowatt-hour units in the same location. These units require about 3 second-feet of continuous flow for each unit. The power feature at its present location is a decided asset to all of southeastern Utah, and as a consequence they are presently constructing, at a cost of $2 million, a 150-mile-long, 130,000-kilovolt line into Moab, Utah, and Monticello, Utah, to alleviate the power shortage experienced in that area because of increased growth and also the mushrooming growth of the uranium mining and milling industry.

I might also mention that the area, not specifically Price or not specifically Carbon County, but the area that we have suggested, of Green River, Utah, has been mentioned prominently as perhaps the location for an atomic furnace reactor, which installation requires some of our resources, among which is water.

Of course, in order to insure these vital prospects we must have the most vital one of all, the continued use of our water.

As has been mentioned many times in the hearings today, we are no exception in feeling that our mountain hideaway is ideal for dispersal of industry and for the development of the natural resources therein. We are served by two transcontinental highways and have a main line highway bisecting the county.

I think it would probably be appropriate to discuss some aspects of the tripartite agreement which our people entered into—and by "our people," I mean the irrigators of the Price Water Conservation District, the irrigation district—in 1943.

It is proposed that if the Gooseberry goes into effect, our water usage would be limited to 46,000 acre-feet of water per year, and our present use by measure of the river commissioner, as I pointed out, is about 68,000 acre-feet a year, to satisfy the users of the decreed and certificated water on Price River. In other words, if the diversion is made, we would out of necessity have to reduce our acreage currently using irrigation water beneficially to less than 11,000 acres.

These waters now being used consist of 258 cubic feet of primary, direct flow water, which, based upon the stream efficiency determined by the Utah State engineer, would amount to 44,640 acre-feet during the irrigation season, plus 30,000 acre-feet of storage water in Scofield Reservoir. This makes a total of 74,640 acre-feet of water that has

been beneficially used by the water users of the Price River system and upon which certificates have been issued and adjudicated. By Utah law, the storage water is appurtenant to the land, and since certificates have been issued, it would seem that 30,000 acre-feet for storage water as shown above cannot be legally separated from the land.

I should also like to point out that the San Pete Water Users Association is not a party to this contract, though they will be the third-party beneficiary. The users of the primary water of the Price River system, including the cities, are not parties to this contract, nor did they in any manner assent to its execution; however, this contract seriously affects the lawful rights of the primary water users, including the cities, in that the Government proposes to take part of their primary rights and divert them into San Pete County by constructing the Gooseberry project.

I might point out that at the time of the tripartite agreement these rights were assigned to the Government by the conservation district and are now being held in trust by the Government.

The Government in the contract then attempts to protect these primary rights by passing that obligation on to the owners of the storage water in the Scofield Reservoir.

I might mention, by way of passing, that there are primary rights above the Scofield Reservoir at the present time. Through this manipulation and from the figures of water use hereinbefore mentioned, the users of the storage water in Scofield Reservoir will be deprived of a major portion of their water in order to sustain the primary-flow rights in the Price River. After accomplishing this, the Government, its successors and assigns—the wording used in the tripartite contract—will be relieved of any further liability and saved harmless from any future claim to the waters diverted by them at the Gooseberry project.

It is difficult for the primary water users of the Price River system and cities to understand under what lawful right, if any, the Government is depriving them of portions of their primary water without their consent. The Government, as has been pointed out before, has attempted to make up such primary water by passing the obligation on to the users of the storage water in the Scofield Reservoir, but in no way assumes any responsibility to guarantee same.

Now, we don't mean to imply that anyone can guarantee how much water is going to be in any certain place at any time. That is entirely dependent upon our Creator. The primary water users have grave doubts as to the ability of the reservoir water users to fulfill this contractual condition. This grave doubt is based on the fact that full beneficial use has been made of the water now available and that the yield of the watershed has not been up to expectations.

The figures used by the Bureau of Reclamation to justify the construction of the Gooseberry project completely ignored the water loss by evaporation and transportation, which, in fact, amounts to approximately 33 percent of the primary and storage water in the Price River system. If the Bureau of Reclamation did not in fact disregard this loss, then they have attempted to pass it off to the water users of the Price River.

It is further pointed out that the soils along the Price River system have been found by use to require in excess of 3 acre-feet of water

per acre on the land in order to obtain the greatest yield therefrom.

I might pause right here and mention that in computing the amount of water that is available on the watershed or in storage, of 30,000 acre-feet, in Scofield Reservoir, which is 40 miles away from the closest diversion point along the river, by taking out the evaporation loss, by taking out the transportation loss, it leaves these people a net acreage delivered at the head of the ditch, and not at the head gate on the land, of 18,000 acre-feet.

Senator WATKINS. That, according to your theory, would only be enough to take care of 6,000 acres.

Mr. WELSH. Yes, sir.

Senator WATKINS. And you claim you have proved up a certificated right for 16,000?

Mr. WELSH. Yes, sir.

Senator WATKINS. And yet you only have water enough for six.

Mr. WELSH. That would be what the ultimate would come out to be, if that is true.

Senator WATKINS. I just wanted to get your view.

Senator O'MAHONEY. How much water do you have now?

Mr. WELSH. With the primary and the storage water, we have 74,600 acre-feet.

Senator O'MAHONEY. And that serves how many acres?

Mr. WELSH. Figuring what is in the proof—and it is still a matter to be adjusted—it is 16,803. That is what was committed. That amount of acreage was committed to these people at the time of the tripartite agreement.

Senator O'MAHONEY. When you speak of proof, am I to infer that the adjudication has not been made?

Mr. WELSH. An adjudication was made twice, sir, for the 74,640 acre-feet.

Senator O'MAHONEY. But to serve how many acres?

Mr. WELSH. 16,803.

Senator O'MAHONEY. Do you think that would be modified by the adjudication?

Mr. WELSH. The present adjudication, you mean?

Senator O'MAHONEY. You say the proof has been made.

Mr. WELSH. Yes, sir.

Senator O'MAHONEY. Do you think the controversy exists, which would reduce that amount?

Mr. WELSH. In our opinion, no.

Senator O'MAHONEY. Is there a controversy?

Mr. WELSH. Yes, sir.

Senator WATKINS. I am at a loss to understand what you meant. A while ago you said only about 18,000 acre-feet.

Mr. WELSH. Yes, sir. Under the operation of the tripartite agreement, which would limit the use of water that we could take off the watershed to a sum total, including the primary flow and the storage right, of 46,000 acre-feet of water, taking the primary flow out of that and attempting to make up the difference out of the storage water would only give you a net of about 18,000 acre-feet of water for the full amount of acreage within the irrigation district. Storage water, pardon me.

Senator WATKINS. Storage water. The primary flow itself is not restrained during the ordinary season flow of irrigation, is it?

Mr. WELSH. At the present time? No, sir.

Senator WATKINS. So that you have that in addition to the storage?

Mr. WELSH. Yes, sir.

Senator WATKINS. So that helps clear up the situation.

Can you give us the total flow, the average flow, of that river, in acre-feet, per year?

Mr. WELSH. As it has been given to me by the Utah Water and Power Board—and I believe it is also contained in the planning report No. 50A—the total flow of the river averages about 81,000 acre-feet of water a year.

Senator WATKINS. Where is that measured?

Mr. WELSH. That is measured at the Hiner gage, which is 40 miles below the reservoir.

Senator WATKINS. That is near the town of what?

Mr. WELSH. It is just about at Helper and between Castlegate at the mouth of the canyon.

Senator WATKINS. How many miles from Price, Utah?

Mr. WELSH. About 10 miles.

Senator WATKINS. And where is the water used for irrigation purposes?

Mr. WELSH. Below the Hiner gage. It would be used over an area—some of the canals are as long as 37 miles.

Senator WATKINS. That is mostly east of Price, is it not?

Mr. WELSH. East and south. It is on both sides of the river.

Senator WATKINS. On both sides of the river?

Mr. WELSH. Yes, sir.

Senator WATKINS. It is a clay formation, is it not?

Mr. WELSH. Yes, sir.

Senator WATKINS. Rather heavy clay?

Mr. WELSH. No, to be perfectly frank with you, Senator, I do not have the soil classification from the Bureau of Reclamation for the types of soils within the irrigation district. I do have an estimate from the Soil Conservation Service, but I understand that their standards are different than the Bureau of Reclamation.

Senator WATKINS. Now, in spite of the claims that you make—I am just trying to get this in to get the facts before us—the Bureau of Reclamation is going to handle the study of this Gooseberry project?

Mr. WELSH. Yes, sir.

Senator WATKINS. And has prepared a report on it, with the possible recommendation that the report be adopted, has it not?

Mr. WELSH. I imagine so, yes.

Senator WATKINS. And the State water and power board, of which Mr. Clyde is the executive secretary, has also passed judgment on this project, has it not?

Mr. WELSH. Yes, sir.

Senator WATKINS. And they have approved it?

Mr. WELSH. That is my understanding.

Senator WATKINS. Now, of course, you object to that approval, and you claim the facts do not sustain the action of the Bureau, either the Bureau or the water board?

Mr. WELSH. Yes, sir.

Senator WATKINS. I want to get the contentions square before the committee.

Mr. WELSH. We have made several efforts to try to call to the attention of the Bureau of Reclamation and the Utah Water and Power Board that this issue was in doubt as far as we were concerned. My position as a private citizen was taken prior to my election as mayor of the city. I am not here representing the city, but we are representing the entire area in Carbon County.

Senator WATKINS. Is Price interested in this?

Mr. WELSH. As a primary water user, not as a city.

Senator WATKINS. Will your water be taken by this project? Will your right be invaded?

Mr. WELSH. Yes, sir.

Senator WATKINS. In what way?

Mr. WELSH. The primary flow will be interrupted to undertake the diversion to the other side of the mountain.

Senator WATKINS. Now let me ask you this question. You are acquainted with the water laws of Utah, I take it, from the way you have been talking.

Mr. WELSH. In a general way.

Senator WATKINS. Are you a lawyer?

Mr. WELSH. No, sir.

Senator WATKINS. You have had a lot of experience with water matters; have you not?

Mr. WELSH. No, sir.

Senator WATKINS. None whatever? You are doing well, I may say.

Under the laws of Utah, those that have prior in time made a beneficial use for that which they can beneficially use are, of course, entitled to first right. And in recent years, we have had a filing statement. With the State engineer's office, the filing of applications for water, and finally the work to make good the filing to put the water to a beneficial use, and then a final certificate from the State engineer's office that that has been accomplished.

Mr. WELSH. Yes.

Senator WATKINS. There are means for the adjudication of all of these rights within the State; are there not?

Mr. WELSH. Yes, sir.

Senator WATKINS. You first get a decision from the State engineer, and after that if you are not satisfied you go into the district court where the lands are located, and if you are not satisfied with that, you can go to the Supreme Court of the State of Utah. Now, have you pending at this time any litigation with respect to the decisions of the State engineer?

Mr. WELSH. No, sir. The last filing by the San Pete Water Users Association was protested by nearly every water user in Carbon County, and we had a hearing before the State engineer nearly a year ago. And it was just a few weeks ago that he rendered his decision. As a matter of fact, I think it has been just 3 or 4 weeks. We have another month in which to file an action in the district court to protest or try to adjudicate the ruling of the State engineer with regard to one particular filing, which is a small one, just a direct flow right of 50 second-feet.

Senator WATKINS. Is it contemplated under that right to transfer the water over the mountain or through the mountain over into San Pete County?

Mr. WELSH. Yes, sir. I think they intend to use it. They perhaps would be in a better position to answer than I.

Senator WATKINS. That is a filing, of course, that in the order of the filings would have priority over yours unless knocked out, over some of the increased uses on your side of the river.

Mr. WELSH. Sir, our filings are held in trust by the Bureau of Reclamation. The filings held in trust by the Bureau of Reclamation have a prior right over any filings with the exception of this one that is now in dispute, the small filing of 50 second-feet. In other words, they would intend to use the water, the Government would, out of the filings they hold in trust to divert what they consider surplus from our watershed to San Pete County.

Senator WATKINS. They have made the decision that there is surplus water there. That is, the records they think show that.

Mr. WELSH. Yes, sir. That is what we have been told. We have tried to resolve this matter.

Senator WATKINS. How did they get these water rights put in trust for them?

Mr. WELSH. By means of a tripartite agreement.

Senator WATKINS. That was a voluntary act, was it not, on the part of the water users?

Mr. WELSH. It was. You could say that was a voluntary act.

Senator WATKINS. In other words, in order to get this big flood-control project over there a certain number of years ago, they placed their water there in trust for the Government.

Mr. WELSH. That is essentially what happened; yes, sir.

Senator WATKINS. That, by the way, was a flood-control project. However, it was constructed by the Bureau of Reclamation; was it not?

Mr. WELSH. That is my understanding; yes.

Senator WATKINS. And it was constructed under flood-control law. In other words, you did not have to pay for the cost of the project.

Mr. WELSH. We are obligated to pay $216,000.

Senator WATKINS. How much did you get without that, have to reimburse the Government for it?

Mr. WELSH. I have heard varying figures on it. Mr. Clyde mentioned the other day when we were in your office that the total cost of the project was three-quarters of a million dollars for the erection of the Scofield structure, $750,000. I have heard that it cost $940,000.

Senator WATKINS. Well, we probably will be able to get the figures from some of the other witnesses. I wanted to get the picture before this committee. I wanted them to see the various angles of this. That is why I ask these questions.

Mr. WELSH. The reimbursable cost is $216,000. We are paying that through the conservancy district which was created at the time. As a further condition of the tripartite contract, if the Gooseberry project is built and goes into operation, the water users of the diverted water on the transmountain diversion, the San Pete County people, are to reimburse us or the Government, if this program has not been paid out, $116,000. That would be a net to us of $100,000.

Senator WATKINS. You have that tripartite agreement there?

Mr. WELSH. Yes, sir.

Senator WATKINS. Do you have an extra copy?

Mr. WELSH. No, sir.

Senator WATKINS. I think that ought to be filed with the committee, because it will not be possible to interpret your testimony that you are giving here without having the contract itself.

Mr. WELSH. You can keep that copy, or we can file it with the committee.

Senator WATKINS. I suggest that it be filed with the committee and not necessarily put in the record at this point.

Senator O'MAHONEY. It will be received for filing, available at all times to the witness and his associates.

Mr. WELSH. We have tried to call to the attention of the State agency involved——

Senator O'MAHONEY. Before you go on with that, may I ask you: Do I understand from your testimony that the Scofield Reservoir is a Wheeler-Case reservoir?

Mr. WELSH. That is my understanding, sir.

Senator O'MAHONEY. Is there any doubt about that?

Mr. WELSH. No, sir.

Senator O'MAHONEY. All right. Proceed.

Mr. WELSH. One particular bone of contention that we have had between the State agency and the Bureau of Reclamation is the fact of the theoretical value of the water on the land being placed at 2.9 acre-feet per acre.

Now, we have attempted to have a resurvey of the area made, on the basis that our usage will vary between 3.3 and 4.8 acre-feet of water, actual usage. As yet, we have not had any indication that the resurvey will be made, although we have received what I would interpret as being a favorable reaction from Mr. George Clyde. Mr. Clyde could either substantiate that or tell you that he will not make the resurvey. We have no word from them at all.

Senator O'MAHONEY. What reason do you have for believing that it would require so much more water?

Mr. WELSH. Apparently, sir, the theoretical value of the 2.9 acre-feet per acre on the land is the standard that is used. Now, we have determined the amount of water that is necesary to be applied to the land by virtue of use, and what it will produce with a certain application of so much water.

Senator O'MAHONEY. You are comparing experience with theory?

Mr. WELSH. Yes, sir.

Senator O'MAHONEY. Experience teaches you that 3-plus is required instead of the 2-plus?

Mr. WELSH. Yes, sir. I believe it is fairly well known that in various areas of my State, for instance, it might require as high as 5 acre-feet of water per acre on some types of soils, depending on the structure. And also by the same theory there may be some lands that will require less usage of water per acre on the land.

We feel—I will make this statement now, Senator Watkins—that article 12 in there is the thing that initiates the Gooseberry and obligates us on that. We know that the tripartite agreement is a valid contract. However, in our estimation it is an unjust contract, in that it has restricted the growth of the area by virtue of restricting the use of the water that has been allotted.

Senator O'MAHONEY. Have you already testified as to what the tripartite agreement is and who were the parties?

Mr. WELSH. Yes, sir. The parties were the irrigators of the area, known as the Price River Water Conservation District, the Department of the Interior, and the Carbon County Water Conservancy District.

Senator O'MAHONEY. And the purpose of the agreement?

Mr. WELSH. The purpose of the agreement, aside from reciting the repayment schedule, and so forth, that must be undertaken for the repayment of the funds——

Senator O'MAHONEY. It was an agreement under the Wheeler-Case Act.

Mr. WELSH. Yes, sir. Also the fact that there was a possibility, in the estimation of the Bureau of Reclamation, that there were sufficient waters available on this particular watershed for a transmountain diversion.

Senator O'MAHONEY. Did your people sign the agreement?

Mr. WELSH. Yes, sir. Qualified representatives of the companies involved and the districts involved signed the agreement; with the exception of the primary water users.

Senator WATKINS. Were they not members of this conservancy district, this conservation district?

Mr. WELSH. No, sir.

Senator WATKINS. What are the total rights of the primary water users on the Price reservoir?

Mr. WELSH. 258 second-feet of water.

Senator WATKINS. Natural flow?

Mr. WELSH. Natural flow, and based on the efficiency computed as 75 or 76 percent by the State engineer, it resolves itself down to a figure of 44,640 acre-feet during the irrigation season, which is April 16 to September 15.

Senator WATKINS. In addition to that, they are getting some benefit out of this project?

Mr. WELSH. Some of them are.

Senator WATKINS. Are they not in an irrigation canal?

Do they not have a water company, a mutual water users company, through which they get their waters?

Mr. WELSH. Yes, the engineer tells me they do.

Senator WATKINS. What is the name of that company?

Mr. WELSH. The Carbon Water Co., the engineer tells me, is the one that receives it.

Senator WATKINS. Are they part of this conservation district?

Mr. WELSH. Yes, sir.

Senator WATKINS. They have an interest in it?

Mr. WELSH. Yes, sir.

Senator WATKINS. As a matter of fact, practically all of the irrigators there have an interest in this conservation district, one or the other of them, do they not?

Mr. WELSH. Not in all respects, Senator Watkins. I believe, as I pointed out——

Senator WATKINS. Not in all respects. But do they have it in limited respects?

Mr. WELSH. Yes. That is what I was trying to get to. Eleven thousand acres are represented by a reservoir right only; 5,803 are represented by a primary water right.

Senator WATKINS. As I understand it, the reason you formed these conservation districts was to make it possible for the taxpayers who were not actual water users in the municipalities, the counties, and others, to enter into this arrangement so that this project could be built, so that it could be paid for. It was too big for the other people. But practically everybody, including the irrigators, are to get some benefit out of this project which was constructed by the United States Government?

Mr. WELSH. No.

Senator WATKINS. Well, who are the participants who are the active agents? Let us take, first, the irrigation district. We have got to get this straightened out somehow to find out who these people are and what their interest is. We have taken the contract, but we cannot examine you on it if we take time to read it here. Who makes up the conservancy district? It has to have some entities.

Mr. WELSH. The conservancy district was formed as the agency to collect the funds to pay the $216,000. Its function is administrative only.

Senator WATKINS. Administrative only. From whom does it collect the money?

Mr. WELSH. Every taxpayer or anyone who owns property in Carbon County.

Senator WATKINS I see. All right. Then the Price River Water Conservation District—who makes up that district?

Mr. WELSH. They are the irrigators of the area. They are the storage-water users.

Senator WATKINS. And the primary-water users as well?

Mr. WELSH. There are a few.

Senator WATKINS. And this irrigation company is also a part of that, has stock in it or an interest in it?

Mr. WELSH. Which irrigation company?

Senator WATKINS. I am talking of the one you said was a mutual water users company, that distributes water to its stockholders. They are mostly the farmers who have these primary rights, are they not?

Mr. WELSH. Senator, may I have you refer your questions of that nature to Mr. Bene, the engineer? He is more familiar with it.

Senator WATKINS. Anybody who can answer. We want to get on this record some information.

Mr. BENE. Down there, Senator Watkins, we have two areas that are formed by the bisection of the Price River, the area on the north side of the river being the oldest water users, and they have the natural flow rights. The fellows on the south side of the river, known as the Carbon Canal Co., own the reservoir water rights and primarily receive all of their water from storage. And there are a few on the north side, but the numbers are very small, who have any such water rights. So they operate entirely independently of the district.

Senator WATKINS. What is the organization that operates the right on the north bank?

Mr. BENE. The Price Water Co.

Senator WATKINS. It has no interest in this at all, directly or indirectly?

Mr. BENE. Well, when they formed the irrigation district and included all the property in the county on the taxable basis, they become interested, yes.

Senator WATKINS. That is exactly what I thought. Under the water district law of the State of Utah.

Mr. BENE. It applies to all of them. That is true.

Senator WATKINS. Now, let me read you this one. This is section 23 of the contract:

> In the event of disputes between the parties hereto arising out of this contract involving questions of fact and insofar as provisions hereof required a determination of facts to be made, the Secretary is hereby designated as the arbiter of such questions, and is the one required to make such determination of facts, and his decision thereon shall be conclusive and binding upon the parties hereto.

What do you have to say to that?

Mr. WELSH. We have tried to call to the attention of the Department through the local people the fact that there was some basis of a dispute in the fact that water would be diverted from the watershed that we thought beneficial use was established to. And so far we have received very little cooperation. I could go through my diary and tell you the number of times that we have attempted to get together with these people and the discussions that we have had, and in most cases, I would say, except up until lately, when they have shown some concern about it, we have not received the concern that we thought we were entitled to.

Senator WATKINS. You do not think you want us to come in and settle this as between you and the people on the other side, in view of the fact particularly that there is a provision here that the Secretary of the Interior has a right to decide this matter, and he is the one that has to decide it, and you cannot take any appeal from his decision?

Mr. BENE. No. But he had nothing to do, sir, with the primary water right.

Senator WATKINS. Well, those primary water rights are all in this irrigation district.

Mr. WELSH. No, they were not thrown into the irrigation district.

Senator WATKINS. Their lands are in there.

Mr. WELSH. The lands are in there.

Senator WATKINS. Certainly. And they are taxed to help pay the cost of the construction of this, and they get some of the benefits of it. If they have to pay part of the cost, they get part of the benefits.

Mr. WELSH. No, I wouldn't say that.

Senator WATKINS. You cannot levy an assessment on a piece of land if they do not get anything out of this contract under the conservancy setup.

Mr. WELSH. It appears to me, Senator Watkins, that we have some that are paying a tax that receive no benefit directly.

Senator WATKINS. Well, that is right, and that is the theory of the conservancy district law, that there will be some people who get an indirect benefit, and they should help pay for the construction of this project. In other words, it was an entire community enterprise when it was entered into. That is the reason why you had it organized as you did. Is that not true?

Mr. WELSH. No. No, their thinking is not that.

Senator WATKINS. I notice here that it specifically provides for the construction or the programing and the construction of this Gooseberry project. That is in article 12, that you talk about here.

Senator O'MAHONEY. Let me see if I can expedite this a little bit.

Did I understand you, Mayor Welsh, to say that you do not expect this committee to adjudicate this particular controversy?

Mr. WELSH. No, sir.

Senator O'MAHONEY. But you started out to say that for some reason or other those whom you represent could not believe that this contract was just to them.

Mr. WELSH. As it turns out, it apparently isn't just, Senator.

Senator O'MAHONEY. But it is not a relevant issue to us.

Mr. WELSH. No, sir, I don't see where it should be.

Senator O'MAHONEY. Is there any reason, then, why we should spend any more time on it?

Mr. WELSH. I see no reason, Senator.

Senator O'MAHONEY. We want you to have all the opportunity in the world to tell your story, you understand. I do not want to shut you off. But there are other witnesses waiting, you know.

Mr. WELSH. We wanted to present the entire story, and the only way we could do it, in all fairness to ourselves and to the people who are pushing for the inclusion of the project, is to bring this matter out to you, so that you can study it. And since it will be included in the proceedings of this hearing, you should have time to do so.

Senator WATKINS. I wanted to be sure that these gentlemen have a full opportunity to present their case.

Mr. WELSH. We certainly appreciate that, Senator Watkins. You started to ask me at one time what the flow of the river was. It was 81,000 acre-feet.

Expanding on that a little bit, even if we subtracted the rights that are in the river, it would still leave a very little to divert to the other side of the mountain. We, too, like other Western States, look for our growth and look ahead to the time when we can be a little more self-sufficient and have diversified our economy.

You might also take the opportunity to read this planning report No. 50A. I have just a rough working copy here, or I would give it to you. But it is rather interesting to note that in this survey, in 1943, it was estimated that there was about 40,000 acre-feet of water that was going down the river. And that was considered surplus water. The other day Mr. Clyde told me that that figure has now become 20,000 acre-feet of water. Of course, that would still justify the construction of the Gooseberry project.

Senator WATKINS. That only intends to take how many acre-feet over?

Mr. WELSH. Twelve thousand, sir. Of course, there were two things wrong with that. One is that if we have been using 20,000 additional acre-feet of water over every 10-year period, in another 10 years another 20,000 acre-feet will be gone. Another thing is that we have, as in most mountainous country, floods that add materially to the flow, which are not there at the particular time when we need them. And they are uncontrolled.

I think this report, together with the information that Mr. Clyde may have, based on information from Utah on the proposition that we were discussing, will indicate that there was not enough of that type of water available to justify the expenditure of any amount of money on the tributaries of the Price River to make up for anything that we may lose by controlling some uncontrollable water.

I also refer you to the United States Geological Survey reports of the flow on the river at various points, and I think by analysis of a day-to-day record you will find that on one particular day the return flow into the river will run—in some cases it is only 40 or 50 second-feet, and in other cases it is a hundred second-feet. But where there is a consistent show of a hundred second-feet in the river past that certain measuring point, the very next day there might be as high as 2,000 second-feet of water passing there, and the following day or the day afterward it will return to its normal flow, which indicates a terrific amount of water coming down all at once, which is uncontrolled.

We had instances in my own city last year, where it rained in town, and in an area a mile and a half away it was bone dry, and no one knew that we were being flooded out. But those are local conditions that we have had and are operating under.

So this is with the idea that we have presented our side of this story and called it to the attention of the Senate. As for S. 500, at the present time, we are opposed to the bill in its present form, and we would recommend that the word "Gooseberry" there be deleted until this question can be resolved and the people in my area can be assured they will have protection of their rights and the continued use of the water on which they have established use.

Senator WATKINS. You tell me that you have conveyed to the United States under this contract the water rights in trust?

Mr. WELSH. That is right, sir.

Senator WATKINS. And that this contract is supposed to have been an agreement in effect to secure the construction of this project by the United States and also in addition there to permit the United States to proceed with the construction of the Gooseberry project?

Mr. WELSH. Yes, sir.

Senator WATKINS. Now you think the contract is unfair?

Mr. WELSH. In some respects it could be considered as unjust.

Senator WATKINS. Yes. And that is the reason why you oppose this Gooseberry project now, because after you have made this agreement you think there is not as much water as was contemplated or understood to be in existence at the time?

Mr. WELSH. Yes, sir.

Senator WATKINS. And now you want the contract set aside. That is the effect of it; is it not?

Mr. WELSH. Another basis, Senator, would be that——

Senator O'MAHONEY. Well, pardon me. Answer the Senator's question.

Mr. WELSH. I am sorry. I did not catch it.

Senator WATKINS. You want the contract set aside?

Mr. WELSH. If the water were on our side of the mountain, that would be the effect.

Senator WATKINS. But when you made this agreement, you said some could go to the other side; did you not? As I understand the law out there, the United States or anyone else would be taking a big chance in building a reservoir unless they can take care of those rights which are clearly entitled to a priority.

Mr. WELSH. Our people have the understanding that they would have the continued use of their water, and that on the basis of surveys made by the Bureau of Reclamation there was an additional amount of water there.

Now, when I say "our people," I mean agricultural people, the people who use the water for agricultural purposes. As it turns out, they are limited to 46,000 acre-feet of water, as compared to the adjudicated and certificated rights of 74,000 feet.

Senator WATKINS. This contract reduced all of the understanding to writing; did it not?

Mr. WELSH. You would think it presumably did.

Senator WATKINS. That is the way it was at the time, was it not? That is the way those contracts are known, because I have drawn contracts between the United States and water users.

Mr. WELSH. My position as spokesman for the group sometimes becomes a little difficult, because at the time the contract was drawn I was in the Army and gone. This contract was not called to my attention until October of 1953; and shortly thereafter, when I was elected mayor of the city, I went out to try to find some additional water for my own city, and I ran into this position that these people have. They have been laboring under a misimpression all of these years that they would have full use of the waters up there that they have been accustomed to using.

I have heard stories, and I cannot substantiate them, that they have tried to get an interpretation of this contract to find out exactly where they stand. And, sir, we did not have an interpretation of this contract until Thursday, February 10.

Senator WATKINS. Of this year?

Mr. WELSH. Of this year; when Mr. Stewart McAllister, one of the attorneys that I believe drew up the contract, represented the Department of the Interior, and Mr. Parley Neely came down to Price to explain this point to us.

That request was made of those people on Monday, January 17, of this year, when a delegation from Carbon County met with Mr. Clyde and Mr. Neely in the offices of the Utah Water and Power Board in Salt Lake City. And at that time that request was made, that the interpretation of the contract be given us. And so far we have had the verbal interpretation of it, which shows a severe restriction in the use of water.

Senator WATKINS. In other words, they say this contract is a good contract and should be enforced?

Mr. WELSH. Sir, it is legally binding and valid.

Senator WATKINS. And the questions of fact are to be determined by the Secretary.

Mr. WELSH. Yes, sir.

Senator WATKINS. Without any right of appeal.

Mr. WELSH. Yes, sir.

Senator O'MAHONEY. Any other questions?

Mr. GERBER. May I ask a question?

Senator WATKINS. You are here to answer the questions, sir.

Senator O'MAHONEY. What is your name?

Mr. GERBER. Ervin Gerber. I am the farmer of the bunch. I have been charged with the duty there for 20 years to dish this water out to the farmers.

Senator O'MAHONEY. I see. So you are the man who handles the water.

Mr. GERBER. I am the one responsible.

Senator O'MAHONEY. Do you know how much there is there?

Mr. GERBER. I sure do. But I forgot now just what I wanted to tell Senator Watkins there, when I butted in, but I know our main difference on the contract is the fact that the greater share of pressure is uncontrolled.

Senator WATKINS. What is that?

Mr. GERBER. The greater share of this water that goes down Price River is uncontrollable water, rising at Castlegate and below our storage reservoir.

Senator WATKINS. In other words, it is not water that can be stored or used?

Mr. GERBER. No. And for the last 25 years we have had an average of 25,000 acre-feet that we can use——

Senator O'MAHONEY. Has the area been benefited by the construction of the Scofield Reservoir?

Mr. GERBER. Yes, sir.

Senator O'MAHONEY. Have the direct flow users benefited by that reservoir?

Mr. GERBER. Why sure. The direct flow users, all of them, have a percentage, a supplemental right.

Senator O'MAHONEY. Have the users on the south side of the Price River been benefited?

Mr. GERBER. Yes. We were benefited by the old reservoir, too, Senator. We lost the old reservoir through flood, and we were continuing to use it to good advantage with the 30,000-foot capacity.

Senator O'MAHONEY. Are you getting more water now than you were before the Scofield Reservoir was built?

Mr. GERBER. Before the last one was built, you mean?

Senator O'MAHONEY. Yes.

Mr. GERBER. Well, I believe over a term of years, yes. We had very few shortages when we had our 30,000-foot storage.

Senator O'MAHONEY. But you fear that if the Gooseberry is built, and there is a transmountain diversion, you will not be receiving enough to satisfy the needs of the community in that area?

Mr. GERBER. Yes; that is right.

Senator O'MAHONEY. And its growth?

Mr. GERBER. Yes.

Senator O'MAHONEY. That summarizes the story, does it not?

Mr. GERBER. Yes.

Senator O'MAHONEY. Thank you very much.

Senator WATKINS. In other words, they need additional water, as they see that the growth has taken place, and I think they probably now regret the contract.

Mr. WELSH. There is no doubt about that, Senator.

I think the feeling was that they would probably never build the Gooseberry, but it is pretty close now.

Senator WATKINS. Well, they took that chance at the time.

Mr. WELSH. It is a rather unusual thing. When the water is controlled by such a small group of people, such as the farmers in the area, who have, of course, established the rights by long usage and by their pursuits of the agricultural industry, everyone else who would like to have some water, of course, is on the fringes for culinary and industrial purposes.

Senator WATKINS. I would like to ask Mr. Gerber one further question. I think that will clear it up.

You said a moment ago that the water users, the irrigators, had an interest in this project to the extent of some supplemental rights.

Mr. GERBER. My statement was, there, Senator, that before the project was there the rights were very poor. The pressure gets down so that you can cross it and never wet your shoes practically every summer. It isn't any big stream. But the first original reservoirs were put in there to supplement these rights, and they were put on these grounds at various percentages.

Senator WATKINS. Well, each side, both the north side and south side, had an interest?

Mr. GERBER. All of it.

Senator WATKINS. And they still have?

Mr. GERBER. Practically all the ground got an allotment, but with varying degrees of amount on each acre.

Senator WATKINS. But on each side of the river, north and south side. So that takes in all the irrigators who have some interest in this, with varying degrees of interest for each individual water user. Is that right?

Mr. GERBER. Yes, that is right.

Senator WATKINS. Well, you fellows will have to get together.

Senator O'MAHONEY I think they have made their statement.

Mr. WELSH. Sir, we certainly appreciate your help and the time you have given us, Senator Watkins and Senator O'Mahoney. It has been a pleasure.

Senator O'MAHONEY. We will now hear from Mr. J. S. McAllister.

STATEMENT OF JOHN S. McALLISTER, ATTORNEY, REPRESENTING SANPETE WATER USERS ASSOCIATION, ACCOMPANIED BY DON V. TIBBS, COUNTY ATTORNEY, SANPETE COUNTY, UTAH

Mr. MCALLISTER. Mr. Chairman and members of the committee, I am John S. McAllister. I am a lawyer in private practice in Utah and residing in Sanpete County, and I represent the Sanpete Water Users Association. With me is Mr. Tibbs, Don V. Tibbs, the county attorney of Sanpete County.

Senator O'MAHONEY. What is the county seat?

Mr. MCALLISTER. Manti is the county seat.

Now, with respect to our statement, Mr. Chairman, we are not going to go into details unless you want us to.

Senator O'MAHONEY. We would like to have you summarize the facts as succinctly as possible.

Mr. MCALLISTER. We would like to do that, too.

The area we represent is, as Mr. Welsh indicated, Sanpete County, and the Sanpete Water Users Association is the approximate north geographical half of the county, or a little less than that. It represents particularly an area of agricultural development. The principal occupation is agriculture, and the principal crops are forage and grain crops, and there is the growing of beef cattle and sheep.

Now, these people that we represent are frugal, industrious, who live in modern homes and have schools and other facilities that you normally have in our American communities. They have all the facilities to make their livelihood pleasant and their economy sound and safe, ex-

cept that during a portion of the year, from about the first to the middle of July until September, there is a dry period after the early runoff water has gone in the spring. And they cannot mature the late season crops, cannot mature sometimes the second crop of alfalfa, and the late grades or buried crops, and the pastures dry up.

Now, Mr. Chairman, our rights are based upon filings that are in good standing.

Senator WATKINS. You mean filings with the State engineer?

Mr. MCALLISTER. The State engineer of Utah under Utah law.

Senator O'MAHONEY. On what water?

Mr. MCALLISTER. That is Gooseberry, the same water Mr. Welsh has been talking about.

To supplement what Mr. Welsh said with respect to the filings, he mentioned a 50 second foot filing which was considered about a year ago by the State engineer upon an application for extension of time.

But the principal filing upon which we are relying is an application which is in good standing and upon which no appeal can now be allowed under the law.

Senator WATKINS. By reason of the fact that time has expired since the decision was made?

Mr. MCALLISTER. That is correct, Senator.

Senator WATKINS. That has to be made within a certain period of time.

Mr. MCALLISTER. Over a year ago, that was, approximately a year ago, and the filing was extended until March of 1958. So there is no appeal to the district court with respect to that filing. And that covers 15,000 acre-feet of storage water if there is that much in he watershed.

The other basis of our claim to the water right is based upon the findings of the Bureau of Reclamation and Geological Survey that there is sufficient water to supply this 12,000 acre-feet, which, with return flow, is boosted up to about 14,000 acre-feet, which will now supply about 16,000 acre-feet of supplemental water and fill in this segment, where the economy is lacking. It is like the fifth wheel of a vehicle. Every wheel is there but the one that is most important.

The rights, we know, are in good standing.

Senator O'MAHONEY. Are they in good standing because of the running of time on the appeal?

Mr. MCALLISTER. That is correct, Mr. Chairman.

Senator O'MAHONEY. There might have been an issue if that technicality had not intervened to prevent the appeal?

Mr. MCALLISTER. There could have been an appeal to the district court.

Senator O'MAHONEY. Not only could there have been an appeal, but there was an issue open on which argument could be made both ways.

Mr. MCALLISTER. Of course, as far as we are concerned, we feel that there is no issue there.

Senator O'MAHONEY. Yes, but as a lawyer, you recognize you would have had to do some work.

Mr. MCALLISTER. If they would attempt to raise the issue, yes.

Senator WATKINS. As I understand, it is your contention that there is enough water over and above what this filing calls for to take care of all of the prior rights ahead of this filing on the Price River?

Mr. MCALLISTER. That is right.

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Senator WATKINS. And that nobody is going to be cut off from this prior right, primary rights, or any other rights?

Mr. MCALLISTER. That is correct.

Senator WATKINS. And this project, if constructed, would have to take the water in the order of priorities with these other people ahead for a certain amount, and then if there is anything left, this project would get it?

Mr. MCALLISTER. That is right, Senator. We are not asking for something that would deprive these folks of their vested rights. We are not only asking for what we are filed on, but we feel what we are entitled to and we know legally is in good standing today.

Senator WATKINS. Irrespective of the legal standing of that, your contention is that there is sufficient water to take care of the rights in the Price River, recognized and adjudicated rights in the Price River, and, in addition, enough to furnish the supply for this project?

Mr. MCALLISTER. That is right, Senator.

Senator WATKINS. You claim that is sustained by the findings of the Geological Survey, and the Reclamation Bureau, and the State engineers?

Mr. MCALLISTER. That is correct.

Senator WATKINS. I just wanted to get your contentions.

Senator O'MAHONEY. How much water in all is involved?

Mr. MCALLISTER. 12,000 acre-feet of transmountain diversion, annual yield.

Senator O'MAHONEY. And that would be in addition to what these people on the Price River are using?

Mr. MCALLISTER. Yes, that is correct.

Senator O'MAHONEY. How much are they using?

Mr. MCALLISTER. We do not know how much they are using. We know approximately that the runoff there is around 81,000 acre-feet. We know that they have put into their canals something over 60,000 at the head of their canals. From these figures there would be another 20,000 acre-feet that would go down the Price River.

Senator O'MAHONEY. And you want 12,000?

Mr. MCALLISTER. We want 12,000.

Senator WATKINS. Your claim is that that 20,000 acre-feet is surplus and goes into the Colorado River, going on down by the farms?

Mr. MCALLISTER. Yes. The water can be stored, Senator, higher up the stream in the proposed Gooseberry, and used to where it will supply the supplemental need for the farms on the other side of the mountain.

Senator WATKINS. Water that is not appropriated is surplus water over and above the rights these people have acquired for use?

Mr. MCALLISTER. That is our claim.

Senator O'MAHONEY. In other words, that this is floodwater which cannot be saved unless the Gooseberry is built?

Mr. MCALLISTER. Or some comparable storage.

Senator O'MAHONEY. Yes.

Mr. MCALLISTER. There is another point that I would like to emphasize to the committee, a little point on history. The Gooseberry and the Scofield were investigated by the Bureau of Reclamation as a joint project, and the Case-Wheeler Act was mentioned.

As I understand it, the investigation was made under the Case-Wheeler Act, but that later the funds actually came from flood control moneys, to rebuild the Scofield.

At the time the Carbon County folks wanted to rebuild their Scofield Reservoir, or at the time the pressure was put on the Government to get some help for them, it was a period of high runoff, about 1941 or 1942, if I remember correctly, and they were afraid that the weakened dam with this high runoff would cause undue danger to railroads and mines and communities down the Price River, so they called us into a meeting with them and we had a conference.

Those folks said, "Now, we would like to have you go along with us on this and divide these two projects into two legs. Let the Scofield go ahead now and then the Gooseberry can go ahead later when funds can be available for that. However, let Scofield go ahead as an emergency program."

Of course, we consented to do that. The spokesman for the folks at that time was their mayor, J. Bracken Lee, who is now the Governor of the State of Utah, and following the newspaper articles at the time I am convinced that the Governor took the lead in the discussions and in the negotiations.

I am just unable to think that Governor Lee, then mayor of Price City, would allow anything to happen which would endanger the rights of his own people.

Senator O'MAHONEY. Sometimes those things happen.

Mr. MCALLISTER. Well, he was their spokesman and looking after their affairs, and I feel that he took care of them.

I believe, unless there are some other questions, I will let Mr. Tibbs carry on with our discussion from here.

Senator O'MAHONEY. Before you turn that over, Mr. McAllister, I would like to hand you what is labeled Map of the Gooseberry Project prepared by region 4 of the Bureau of Reclamation, and ask you to tell me what you understand the Mammoth Reservoir to be in the northeastern corner on that map [indicating].

Mr. MCALLISTER. There was a reservoir mentioned previously in the testimony of the Price folks, called the Mammoth Reservoir, which failed. That we now call the Mammoth Reservoir site, and we still call the new developments Mammoth Reservoir, interchangeably with Booseberry Reservoir.

Senator O'MAHONEY. That is the Gooseberry Reservoir?

Mr. MCALLISTER. They are identical sites.

Senator WATKINS. It is somewhat misleading on the map.

Senator O'MAHONEY. I wanted to be sure that we were talking about the same thing.

Mr. MCALLISTER. They are identical.

Senator O'MAHONEY. All right, Mr. County Attorney.

Mr. TIBBS. Mr. Chairman, my name is Don V. Tibbs. I am attorney for Sanpete County in the State of Utah.

I am here at the request of the Sanpete County commissioners and also at the request of the mayor and councilmen of Sanpete County, comprising approximately 19 communities.

I believe we have gone into this pretty thoroughly, but we desire that the record show that we are very interested in the Colorado project as a whole, the upper Basin States, and Gooseberry, in particular, and that our rights are based primarily on the filings in the State engineer's

office in the State of Utah and upon the tripartite agreement which has been mentioned.

Also, as late as February 19, the Utah Water and Power Board once again reiterated its stand in favor of this project, and we sincerely hope that this project will be continued in the bill, and will go forward and become the law of the United States and be authorized, because there is water going to waste and we simply desire to get this valuable water over to the people of our communities.

Thank you.

Senator O'MAHONEY. Are there any questions?

Senator WATKINS. I have no questions.

Mr. MCALLISTER. May I make one more statement, Mr. Chairman?

Senator O'MAHONEY. Yes, indeed.

Mr. MCALLISTER. There has been an unfortunate phraseology develop in our talking.

The words "tight dam" have been applied to the Gooseberry or Mammoth Reservoir. "Tight dam" does not mean that no water can go by the dam. It of course means that a dam can be shut off and it can be opened, and that primary water right could be let down the stream.

Senator WATKINS. As a matter of fact, you would have to have a gate in the reservoir for the safety factor, if nothing else.

Mr. MCALLISTER. That is right.

Thank you.

Senator O'MAHONEY. Thank you, Mr. McAllister and Mr. Tibbs. We appreciate your testimony.

General Grant, will you be good enough to come forward now? We are sorry to have kept you waiting, but you know how congressional committees operate, open forums, for everybody to speak.

STATEMENT OF MAJ. GEN. ULYSSES S. GRANT 3D, APPEARING ON BEHALF OF THE AMERICAN PLANNING AND CIVIC ASSOCIATION

General GRANT. Mr. Chairman, on behalf of the American Planning and Civic Association, of which I am president, I wish to express our appreciation of your invitation to appear before you, and of the opportunity to present some facts that we believe to merit your consideration in a matter so important to the whole country as Senate 500.

May I assure you that we are not opposed to this bill in toto, but merely to the inclusion of the Echo Park Dam in the authorization. We would indeed like to see a balanced and economically justified program for the conservation of the waters of the upper Colorado River Basin, but, in what we believe are the best interests of the American people, we earnestly petition you to eliminate from the bill the Echo Park Dam, because it will destroy forever by flooding, a unique and inspiring area of natural scenery, especially selected for preservation, the very special recreational values now afforded the public for navigation on and camping along the banks of torrential streams, and in tremendously impressive surroundings and unexplored anthropological deposits and as yet untranslated Indian hieroglyphs—all a part of the heritage of future generations entrusted to us for perservation unimpaired.

It is very pertinent that the proposed authorization of this dam in a national monument, an integral part of the national-park system, will be inconsistent with policy established so wisely by Congress in the act creating the National Park Service and confirmed in the amendments to the Federal Power Act, and heretofore adhered to since 1916.

We know that there are a number of other projects proposed to invade and encroach on the national-park system for which the same or similar arguments are urged and that this dam, if authorized, will inevitably be used as a precedent to secure similar legislation for these other projects and for encroachments into such natural wonders as the Yellowstone National Park, the Grand Canyon, Mammoth Cave, Glacier National Park, and so forth. The contention that this will not constitute a precedent is specious and just appeasement talk. A precedent is a fact, not a theory, and once public policy is violated, there is a precedent raised for violating it again and again.

The proponents of this dam, finding themselves unable to deny my contention as to this dam not being necessary, have had to invent a statement which could obviously be denied, and have falsely attributed it to us, opponents of the dam, namely, that we erroneously claimed the dam would flood out the dinosaur remains. Of course, none of the opponents have ever made any such claim, at least as far as I know.

Senator WATKINS. At any time?

General GRANT. As far as I know, at any time, sir.

Senator WATKINS. Did you not make a statement once that you found that it would not cover the bones and there was no longer any claim being made for that contention?

General GRANT. I do not remember that, Senator. Your memory is perhaps better than mine.

Senator WATKINS. I have some sort of memory that somewhere along the line that was the claim and then it was discovered later on that the reservoirs would not cover the area where the bones had been deposited.

General GRANT. Certainly I think in every statement I have made I said that we recognize that we do not have the dinosaur deposits.

Senator WATKINS. I do not know whether you personally made that claim or not, but some people were making that claim at one stage. I remember that rather distinctly. They were opponents of the project on the ground that it would be invading the Dinosaur Monument and would cover up these prehistoric remains.

General GRANT. I first came into this at the hearing held by the Secretary of the Interior on April 3, 1950, and my recollection is that even at that time we recognized the fact that the bones were not in danger of being flooded.

Senator WATKINS. Did the exchange between you and me happen after that time, or before that time? You know what I mean, do you not? I made some statement on the floor of the Senate.

General GRANT. Yes. That was after that time.

Senator WATKINS. I am not sure in my own mind.

General GRANT. That was after that time, because I tried to respond to that respectfully, in a memorandum for the Secretary of the Interior, which was written in August 1951.

Senator O'MAHONEY. Then, General, would I be correct now in assuming that you would like to have all of your followers understand that in your opposition to the building of the Echo Park Dam you do not now contend, and never have contended, that the Dinosaur Monument, consisting of the 80-acre monument set aside by President Wilson, from which and only from which the dinosaur bones have been mined or quarried, will not be affected in any way by the Echo Park Dam?

General GRANT. I do not know, sir, whether the matter would cover the full 80 acres, but certainly the deposits of dinosaur bones as known at the present time will not be affected.

Senator O'MAHONEY. You want all your followers to know that so that if I receive a letter from anybody who has been persuaded by your very excellent article in Collier's weekly, that the dinosaur bones are jeopardized by Echo Park, I can tell him on your authority that he is mistaken?

General GRANT. Yes, sir. I do not think in that article, sir, I said that they were jeopardized.

Senator O'MAHONEY. Maybe not, but elsewhere they get that impression, you know. An incorrect impression, I think, is developed from the statements you used this afternoon about the national-park system. I am sure that you have no intent to create any misapprehension, but the average person hearing you say that the national-park system is being invaded would think you are saying that the national parks are being invaded, when you and I know that the Dinosaur National Monument is not a national park and never was so created, and that no national park has ever been created except by act of Congress, and that this monument was set aside by an Executive order of President Roosevelt in 1938 when he expanded the 80-acre monument created by Woodrow Wilson to preserve the bones by 200,000 acres.

General GRANT. That is historically correct, sir, but I believe that the national monument can be and is properly termed a part of the national-park system.

Senator O'MAHONEY. Oh, yes. Then, when the Congress of the United States did not create such a national park, then the President did it by Executive order, by creating a monument. That is the impression which is desired to be conveyed by those who take the position that you have taken.

The legal position and the actual position is that these 200,000 acres do not constitute a national park, because only Congress can create national parks, and that they were not necessary under the Antiquities Act to protect the 80-acre quarry, which has never been disturbed, and is not covered by this bill.

General GRANT. May I point out, sir, that the Federal Power Act, as amended, specifically prohibits the putting of dams and reservoirs in national monuments, as well as national parks, so that we feel that we are really on a sound basis when we speak of this as part of the national-park system.

Senator O'MAHONEY. Do you not know that the order creating the extension of the national park contained a specific provision, written in there by the Federal Power Commission, to preserve the right of building power dams in this very area?

General GRANT. That is not the interpretation that we have of it, sir.

Senator WATKINS. That is the interpretation that the Department of the Interior takes—that it is not an invasion—and I have made some research recently and I find it is a much stronger case than most of us anticipated by some of the preliminary work that has been done on it.

Just simply turn the situation around. The national-park system is trying to invade a reclamation project and the natural storage place for waters that belong to these people upstream, and it is just as important to have a place to store the water in that area as it is to have the water.

General GRANT. We feel that that is a little different. I try to handle that in the next paragraph.

Senator KUCHEL. General, may I interrupt you just for one second because I did have the pleasure of recalling the testimony you gave a year ago and I would like to say that a part of your statement of last year does contain the following phraseology.

I quote from page 465 of last year's hearing:

> Aside from the deposited dinosaur remains which would not be affected by the proposed dam * * *.

You said then exactly what you say now in that regard.

Senator WATKINS. Mr. Chairman, I have another appointment. General Grant and I had an exchange of views not quite a year ago when he was before the committee and the same bill was before us, and whatever examination I made then I am going to make the examination for this time. I am going to let that be the examination for this time. I doubt if there is any change in views on either side.

I expect later on to present to this committee the pictorial record, the graphic recordings of fillings, where they exist, what territory they took in, the date they were approved, and the whole works, which I think presents a rather different story from that contended by the Department on the ground it is invading the monument. I think it is the other way around.

General GRANT. I am told by people who should know, connected with the Smithsonian Institution, that there are anthropological and archeological remains in the canyons which they would like and think should be explored, and that the Indian hieroglyphs on the canyon walls which have never been interpreted, the key for the interpretation of which has not been found yet, and which are now under scientific research. These are not the only ones, of course, but these might be the ones that would help in that interpretation of Indian culture and would be worth being preserved for that reason, so that there is a scientific loss that is going to be occasioned by this reservoir.

When, at the Secretary of the Interior's public hearing on April 3, 1950, I first showed that there are alternative sites, reported on by the Bureau of Reclamation itself, which will furnish more storage capacity and more power at less or equivalent capital cost, the fact could not be directly denied, so it was alleged that their use would increase the loss by evaporation by 350,000 acre-feet annually.

In a memorandum report of August 1951 to the Secretary of the Interior I showed conclusively that this allegation was sadly in error; that the Bureau's evaporation studies were based entirely on inade-

quate observations of a few Weather Bureau stations not located even near the proposed dam sites. That the coefficient used in translating these pan observations into probably lake evaporation was unjustifiedly high; that they had failed to deduct the evaporation expected on the Echo Park and the Split Mountain Lakes; and that the differential would not be more than a third of the alleged amount.

Evidently the Bureau had to concede that I was right, because in the last year's hearings, Mr. Tudor, Under Secretary of the Interior, accepted the 100,000 acre-feet differential possibly as his yardstick. At least he accepted my corrections to the Bureau's faulty arithmetic, but ignored the inadequacy of the basic factual observations, the entire lack of observations of varying water and air temperatures, wind conditions, and other important data entering into any reasonable advance computation of lake evaporation.

I testified at some length before your committee on this subject last spring, and refrain from repetiton.

However, it is of interest that the whole subject of evaporation was independently investigated ab initio by a research associate at Cornell University, who came to very much the same conclusion, namely, that, in the light of available factual observations, there was inadequate justification for the claim of any important additional loss by evaporation.

Nevertheless, Mr. Tudor based his recommendation for inclusion of the Echo Park Dam solely on "the irreplaceable loss of enough water to supply all the needs of a city the size of Denver"—that is, his figure of 100,000 acre-feet annually—and yet the differential loss for one alternative which he suggested himself, the raising of the Glen Canyon Dam 50 feet, which at first, accepting the Bureau's computations he gave as 165,000 acre-feet, he afterward corrected to 25,000 acre-feet.

This shows that, like Brutus, Mr. Tudor is an honorable man, and also that the Reclamation Bureau's personnel is somewhere both careless in its arithmetic and far from being meticulous in what it presents as facts.

It is not irrelevant to this discussion of its arguments to save the Echo Park Dam that, in this article in the Saturday Evening Post last November, Mr. Tudor himself pointed out three other cases in which he found the Bureau's figures grossly inaccurate:

(1) Estimates of cost and benefits to the United States of the Anchorage power project, the Anchorage hydroelectric power project;

(2) The appraisal of the Arizona power lines; and

(3) The "indefensible writeoff"—those are his terms—in the Grand Coulee power rates.

The Bureau itself in its pamphlet on canal linings and methods of reducing costs has pointed out that 25 percent of the water diverted for irrigation is lost by seepage before it reaches the farmers' fields. A very small part of the cost of the Echo Park Dam expended in lining the irrigation canals will obviously save more than the hypothetic differential in eliminating this dam from the program. The evaporation argument is just untenable and academic, an argument to destroy the unique character of a part of the Nation's heritage.

I do not presume to question the good faith of the Bureau and of those who have been misled by the apparent completeness of the program recommended in its 1950 report; I am merely pointing out to

your committee its faulty analysis and faulty arithmetic, being convinced that you will wish to exercise great caution in accepting the Bureau's conclusions based upon it, or offered in defense of its elements.

For instance, it has been stated that the Echo Park Dam is the keystone of the whole program, that the power it will produce is necessary to help pay back the capital expenditures for irrigation. Yet the Bureau proposes to charge 6 mills per kilowatt-hour for power, the limit thought practicable in competition with private power produced by steam, whereas it estimates that the cost of power will be 5.9 to 6 mills, and the Federal Power Commission computes the cost as 6 to 6.19 mills per kilowatt-hour.

As the Echo Park Dam is not intended to store water for irrigation, it having been intended to provide for the needs of Utah irrigation from the Flaming Gorge Reservoir by gravity flow and the shift to Echo Park with the additional cost of pumping having obviously been an afterthought, to justify the Echo Park Dam, justification of the Echo Park Dam rests solely upon the electric power it is expected to produce for sale.

It is obvious that no such economic advantage can be hoped for from power costing 6 mills or more when sold for 6 mills.

It would seem as though, if the northern part of the upper Colorado Basin is in need of additional power, it would be much more economical and sounder policy to build a steam plant which would furnish the power at no more and probably less cost, which would cost very much less to build than the Echo Park Dam, and which would give a market for the coal in that region and keep your miners at work up there, instead of taking their possible employment away from them.

The Bureau's 1950 report gives the benefit-cost ratio as 1.8, whereas the Federal Power Commission found it to be 1.08. That is 1 point and eight one-hundredths, not eight-tenths. To be sure, this was when it was proposed to sell the power at 5.5 mills, but the estimates of power cost were raised with the selling price.

It all goes to show that, as the Chief of Engineers said in his July 3, 1951, analysis:

> The report is actually a preliminary treatment of a plan to provide regulatory storage capacity and power-production facilities for the upper Colorado River Basin without full development of sufficient fundamental data for comprehensive planning of such a system.
>
> Authorization of such plans should be sought only after the basic elements have become reasonably firm. When major questions remain unsolved, premature authorization may actually hamper and restrict future planning.

The sudden scurry of late, relative to determining the soundness and adequacy of the foundation for the Glen Canyon Dam, but confirms the view that the recommendations were originally made in 1950 without sufficient field explorations, and in the ebb and flow of the discussion during the last few years, such explorations have been hurriedly undertaken only to meet criticisms.

The Glen Canyon Dam is all important in the program because it is the one and only one at which electric power can be produced at a cost, estimated by the Bureau at 4.7 mills and by the Federal Power Commission at 4.2 mills, or less, that will insure a substantial profit when sold at 6 mills a kilowatt-hour.

If the Federal Power Commission's estimate of cost is correct, the differential in cost between the cost of Glen Canyon and Echo Park

power will be five or more times the profit possible on Echo Park power at the lowest estimate of its cost. The Echo Park Dam is evidently entirely unnecessary to help pay for these other projects, and any claim that it is becomes as disingenuous as the other arguments for this harmful and destructive structure.

I leave to others presentation of the special park and recreational values of this area. I limit myself to pointing out that the reservoirs will actually and inevitably destroy, not merely change, the picturesque, unique, and imposing scenery.

To put with equal truth, Mr. Chairman, if I may be permitted to make the analogy, it might be said that cutting off the tails of your swallowtail dress coat will change it, but not destroy it.

Senator O'MAHONEY. As a matter of fact, of course that has been done for most of us already without any injury at all to the good looks of the male citizen. The swallowtail has been pretty much abandoned.

General GRANT. I realize that the peajacket was in use in the Army during the Civil War and that it was in use as a mess jacket during my day, but I still feel that your dress coat with the tails cut off would be unsuitable for the purpose for which it was purchased.

Senator O'MAHONEY. The tuxedo still makes a pretty good substitute, in any company.

General GRANT. That is a complete whole in itself. What you are doing with this Echo Park Dam is cutting the bottom off of it, and the bottom is the essentially picturesque and imposing part of the canyons.

Likewise, the claim that hardly anyone can or does visit the monument to enjoy its special scenic and recreational values is just untrue.

In spite of its present alleged inaccessibility, 14 percent more people visited it in 1953 than visited Yellowstone National Park in 1910, 38 years after it was established, and the number of visitors during the past year was three times as many as the year before.

If only a small part of the $21 million recommended for making recreation on the proposed lake possible for the public were spent in improving the relatively short distance from the main transcontinental automobile Route 40 in to the monument, and people were told about it, they would be flocking in there by hundreds of thousands.

Equally deceptive is the claim that a lake will have equal or greater recreational value. In the first place, any alternative reservoir, such as I have suggested, will have the same or greater lake recreational values. In other words, you would not be taking away a lake by using an alternative site instead of the Echo Park Reservoir.

In the second place, with the 7 or 8 other reservoirs in the program, lake recreational opportunities will be so many as to be a drug on the market. The people who now go to Lake Mead for their fun go there because of lack of competing equally accessible large lakes in this arid region. If they were divided among nine other lakes, the number would be less impressive. This is just another example of the unjustified arguments offered by the proponents of the Echo Park Dam.

I happened in recent weeks to be interested in one of these lakes that is supposed to be a recreational refuge and which is managed by TVA for power, and the level of the lake is now 234 feet down, so the local paper published a story under the heading, "The lake that isn't there."

Senator O'MAHONEY. You will not regard it as at all impolite if I say that the title of your testimony might well be termed "The Dinosaurs That Aren't There"?

General GRANT. I think the dinosaurs are still there, and they are going to stay there, are they not, sir, except when they are excavated?

Senator O'MAHONEY. Only their bones.

General GRANT. Similarly, the claim that the exception made in the Executive order establishing the monument in favor of the Brown Park site opens the monument to any other intrusion does not hold water. The Brown Park site, like permitted grazing of sheep, was a vested right that could not legally be disregarded in the President's order without due process of law. The order carefully put the monument squarely under the Federal Power Act, which prohibits such invasions, and only excepted the Brown Park site because it had already been covered by registered filings.

Senator Watkins said something new on that subject which I shall be interested in seeing, because it is my definite recollection that when we met with the Secretary of the Interior before the hearings last year, he gave us to understand that his legal counsel indicated that this view that I have stated was correct. There may have been a change.

Senator O'MAHONEY. Do I understand you to say that you recognize that grazing was permitted there?

General GRANT. Yes, sir; because it had been going on for years, and it was something that could not have been stopped without loss of property, which would require condemnation.

Senator O'MAHONEY. It has been going on ever since?

General GRANT. Yes.

Senator O'MAHONEY. In other words, in the extent of national monument, the grazing of livestock has been permitted by the National Park Service?

General GRANT. As a right that had been established.

Senator O'MAHONEY. Since 1938 when it was created. That is right, is it not?

General GRANT. I think it was done before that, sir.

Senator O'MAHONEY. Yes, but I mean that National Park Service has not objected to the grazing throughout the entire life of the extended Dinosaur Monument.

General GRANT. I would not be so venturesome as to say it has not objected to it.

Senator O'MAHONEY. It has tolerated it.

General GRANT. It has had to tolerate it because it is an established right.

Senator O'MAHONEY. The point I wish to make now is that it has not created a precedent to induce any livestock man to seek grazing in Yellowstone Park or in Grand Teton Park, or any of the other national parks. In other words, this grazing use of a national monument is not a precedent for a violation of the park rules, and I do not know any reason to believe that the building of the Echo Park Dam in the monument there would cause an invasion of any other national parks. In other words, there was a precedent for grazing, which has not been followed. You say this would be a precedent for the invasion of other national parks. That does not follow from the experience with grazing.

General GRANT. This is making an exception to a policy in an established park in which there is no such dam, sir.

Senator O'MAHONEY. I am glad to be able to state to you, General, and to the public who read the record here, that having been a member of this committee for many years, with a slight interruption, and having known Members of Congress in both Houses for many years, and the people of the West, I think I can say to you that none of them that I know anything about would tolerate any invasion of the national parks as created by Congress.

General GRANT. It is noteworthy that the distinguished authors of S. 500 have themselves been so doubtful of the economic justification for the irrigation projects that the bill authorizes them only—and I quote in substance from the bill—after—

a reappraisal of the prospective direct agricultural benefits of the project and certification thereof by the Secretary of Interior

after a—

reevaluation of the nondirect benefits of the project; and allocations of the total cost—

all certified after justification, individually.

However, it authorizes the dams to be built before justification for their cost if their primary purpose to help irrigation is justified, especially the Echo Park Dam, which will destroy irreplaceable values.

Senator O'MAHONEY. General, then let us say that it has always been the policy of Congress under the reclamation law to require the finding of feasibility of a reclamation project. That is nothing new, and it is not in any sense an evidence of doubt. It is merely an evidence of the desire of Congress to be sure that the feasibility will be there, but the construction of the dams in advance of the construction of certain reclamation projects is authorized under the Colorado River compact, so that we may save from complete wastage into the Gulf of Mexico the waters that are flowing down the Colorado River, and which have flowed down there for so many years that nobody could possibly count them, leaving wreckage and ruin apart.

This whole area needs water.

General GRANT. Senator, may I emphasize that we are all for a project in the upper basin of the Colorado, a sound and economical project, but we are convinced, after study, that the Echo Park plan is not necessary and we want to save that national monument and scenery for future generations.

This is neither the time nor place for me to comment further on previous errors in economic analysis and cost estimates of the Bureau of Reclamation. This has already been done by others better able and with more time for research, notably by Raymond Moley in his recent brochure for the American Enterprise Association.

The pertinence of these studies—and the latter is not the only one—to the present case, is only to show that the Bureau's economic analysis is probably also wrong in this case, as I have shown.

I am interested in noting that 3 of the dams I have previously recommended for construction in the first phase are specially included in S. 500, and there can be no objection from the overall standpoint to the Curecanti and Navaho Dams, if economically justified. In fact, I would say I would have included the Navaho Dam in my original

recommendation for the first phase 2 years ago, except at that time it was being adjusted with the Indian Bureau, I understood, and it was better to keep off of it until that interdepartmental question had been settled.

They will make the Echo Park Dam entirely unnecessary for many years. It will take 20 to 30 years to fill their reservoirs; and so it will be only good American commonsense for you to eliminate authorization of the Echo Park Dam from this authorizing legislation now, let the program at last be started—it has been delayed for 4 years by the insistance on this one dam, and let future Congresses decide whether the filling of the great canyons of the Green and Yampa Rivers cannot be preserved as one of the natural wonders of our country, one of the most unusual and inspiring recreational areas, in the world.

Future generations will then admire your foresight, and record that this 84th Congress of the United States had the wisdom and greatness to see through the specious arguments of the present proponents of the dam, the lack of justification for it, and the damage it will do, and to save this area unimpaired for posterity.

Senator, this is a time for greatness in the world's crisis, and we respectfully urge you to be great in your decision in this case of national importance, as you will surely be in those of international importance which you are being called upon to solve.

Thank you very much.

Senator O'MAHONEY. Thank you, General.

Have you any questions, Senator Kuchel?

Senator KUCHEL. I have no questions.

Senator O'MAHONEY. General, I would just like to ask you one or two questions.

One is prompted by your recent statement apparently endorsing the articles of Raymond Moley with respect to reclamation.

You are for this project except for Echo Park?

General GRANT. Yes, sir. We are not offering or suggesting any opposition to it.

Senator O'MAHONEY. You do not accept then Mr. Moley's argument against reclamation per se?

General GRANT. I hate to confess it, Senator, but I do not think I know enough about the economics of the irrigation projects as carried on by the Reclamation Bureau to have any convictions on the subject.

Senator O'MAHONEY. If you are, as you stated originally, for the development of the upper basin——

General GRANT. We are, for arid regions.

Senator O'MAHONEY. Yes. Then you cannot be for Raymond Moley's recent statement, because that takes the other side.

Genral GRANT. We are against it only insofar as this general program does not seem to be well thought out and economically sound, and maybe this just falls in and confirms somewhat the things that he said. I am not an expert on these statistics, and the analysis that he made.

Senator O'MAHONEY. Of course, the committee will have to decide before it acts upon the bill, whether not only the Bureau of Reclamation, but the Secretary of the Interior, and the President of the United States are endorsing a program that is economically unsound,

because all of them have done it, and of course, prior to the beginning of the present administration, the Bureau of Reclamation made the studies, made the reports, and recommended this project, and their testimony here has been explicitly that the 11 participating propects are economically sound.

As I understand your argument, it chiefly is in defense of the scenery in the Yampa and the Green Rivers.

General GRANT. And against the violation of the principle of beginning the building of these dams in national monuments or national parks.

Senator O'MAHONEY. I just think that that argument is not well taken, General, but that is neither here nor there.

General GRANT. Also that this Echo Park Dam is supported by arguments that are specious and that it is not necessary economically; that pretty good results can be obtained otherwise.

Senator O'MAHONEY. I am not clear just how you think economically good results can be obtained otherwise, particularly, for example, with your suggestion about building the coal-steam plant. You do not seriously advocate, do you, that this committee should authorize the Government of the United States to make power out of coal?

General GRANT. I am constitutionally against the Government going into business, but that is a much more economical solution, and a better solution than the Echo Park Dam.

Senator O'MAHONEY. Then it was an easy argument to use, but one which you would not follow out if you were sitting as a member of this committee?

General GRANT. The Government would not have to build the plant. They could give some assistance to private enterprise to build it.

Senator O'MAHONEY. Did I not hear you once say that there was no market for power in this area?

General GRANT. My suggestion was made on the condition that if there was need for electric power in the upper area, that——

Senator O'MAHONEY. If I may interrupt, General, I do not want you to go away emptyhanded, so I am going to hand you this statement by the private power companies of this area.

General GRANT. I know they have made a contract to buy the power.

Senator O'MAHONEY. No; they have not made a contract yet. They are trying to. They would like to make a contract because they believe that there is going to be a market there vastly greater than anybody imagines. I think that you might find that interesting.

General GRANT. Then the steam plant would be a sound proposition.

Senator O'MAHONEY. No; they do not suggest a steam plant at all. They are talking about this water.

General GRANT. They would rather get subsidized hydroelectric power, I suppose, sir, starting with the same premise that you did, that the Government would not build a steam plant.

Senator O'MAHONEY. I happen to know that Congress has repeatedly refused appropriations to build steam plants.

In the course of your testimony, General, you seem to imply, as I recall, that the construction of the Echo Park Reservoir, or need of any reservoir within the National Dinosaur Monument as extended would be a violation of the law under which the Power Commission operates?

General GRANT. I believe so; yes, sir.

Senator O'MAHONEY. There has been handed me a copy of the act of March 3, 1921, Public Law 369 of the 66th Congress.

This is entitled "An Act to amend an Act entitled 'An Act to create Federal Power Commission, to provide for the improvement of navigation, the development of water power, the use of the public lands in relation hereto, and to repeal section 18 of the River and Harbor Appropriation Act, approved August 8, 1917, and for other purposes, approved June 10, 1920'."

The first sentence of this law reads as follows:

> That hereafter, no permit, license, lease, or authorization for dams, conduits, reservoirs, powerhouses, transmission lines, or other works for storage or carriage of water, or for the development, transmission, or utilization of power within the limits as now constituted, or any national park or national monument shall be granted or made without specific authority of Congress.

Therefore, there appears to be a limitation upon the construction of powerplants, perhaps by Executive order, just as this monument was done, without the specific authority of Congress.

Would you care to have this for your files?

General GRANT. I do not know whether that is the amendment. Of course, if I may point out, one Congress does not limit what another Congress does.

Senator O'MAHONEY. Certainly not.

General GRANT. It does establish a policy and we are asking you to adhere to that policy, and that act was amended on August 26, 1935, section 3, which had omitted the national monuments and the national parks to be built, so as to read:

> Shall not include national monuments or national parks—

which would include all of those.

Senator O'MAHONEY. That is a Power Commission law that you are reading from now?

General GRANT. This one is the Power Commission law.

Senator O'MAHONEY. No; the one that you are reading from. That is strictly a Power Commission Act.

General GRANT. Yes, sir.

Senator O'MAHONEY. That does not limit Congress. The Power Commission can be limited, but Congress is not limited. In other words, there is no violation.

You do not question the authority of Congress to build this dam, do you?

General GRANT. No, sir; I just point out that Congress established a very wise policy by this act, and it applied that policy——

Senator O'MAHONEY. Not in that act and the other act that you read, it does not apply.

General GRANT. If the Federal Power Commission cannot grant licenses for the construction of this kind of a thing in a national park or a national monument, that certainly indicates a policy, does it not, sir?

Senator O'MAHONEY. The Power Commission cannot grant it without the authority of Congress, so Congress gives it the right. That is merely the attempt of Congress to prevent the executive commissions and boards from exercising the power of Congress.

When the President, in 1938, extended the Dinosaur National Monument by 200,000 acres, in my opinion the language of the Antiquities Act which prescribed that the President should use the smallest amount of land available would mean there was an extension of Executive authority beyond the limits granted by Congress. That is just my opinion. We may debate that all night, but I just wanted the record to show that, inasmuch as you have brought up the other side.

General GRANT. Of course, may I put in the record that we feel that the amount of land added was only what was necessary to preserve unimpairment for the future generations.

Senator O'MAHONEY. However, I call your attention to the fact, General, that the language of the order itself showed what the purpose was. It was not called the Echo Park Monument. It was not called the Yampa-Green River Monument. It was not called the Scenic Monument. It was called what? An extension of the Dinosaur National Monument, and there is not a thing in this area on which the Echo Park will be built, or in which this lake will be created which in any way, form, or shape, has any relevance to the Dinosaur National Monument. It was just the words of the order, and I have no hesitancy in saying, as I contended with respect to the Executive order on Teton National Park, and it was an attempt to do by indirection what Congress had not done.

General GRANT. Senator, that is not for me to argue, but maybe it was just the playground of the dinosaurs, so it might be kept for us.

Thank you very much.

Senator O'MAHONEY. I am delighted to see you.

The committee will be in recess until tomorrow morning at 10 o'clock in this room, 224, Senate Office Building, at which time the witnesses from the Wilderness Society and the National Wildlife Federation, Wildlife Management, and the Sierra Club will be heard, perhaps among others.

(Whereupon, at 5 p. m., the committee recessed until 10 a. m. on Thursday, March 3, 1955.)

COLORADO RIVER STORAGE PROJECT

THURSDAY, MARCH 3, 1955

UNITED STATES SENATE,
SUBCOMMITTEE ON IRRIGATION AND RECLAMATION
OF THE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS,
Washington, D. C.

The subcommittee met at 10 a. m., pursuant to recess, in the committee room, 224, Senate Office Building, Senator Clinton P. Anderson (New Mexico), presiding.

Present: Senators Clinton P. Anderson (New Mexico), Eugene D. Millikin (Colorado), Joseph C. O'Mahoney (Wyoming), Arthur V. Watkins (Utah).

Also present: Senators Thomas H. Kuchel (California), Barry Goldwater (Arizona), Gordon Allott (Colorado).

Present also: Stewart French, staff director and chief counsel; Goodrich W. Lineweaver, staff member for reclamation; William K. Coburn, staff member for public lands; James Gamble, staff member for Indian affairs; Richard L. Callaghan, chief clerk; N. D. McSherry, assistant chief clerk.

Senator ANDERSON. Dr. Richard Bradley.

I had promised the California people we would start off with them this morning. They tell me it is all right for Dr. Bradley to go ahead because he has to get back.

STATEMENT OF DR. RICHARD C. BRADLEY, DEPARTMENT OF PHYSICS, CORNELL UNIVERSITY, ITHACA, N. Y.

Dr. BRADLEY. I appreciate the opportunity to appear now when you are pressed for time.

My name is Richard Bradley. I am research associate in physics at Cornell University, Ithaca, N. Y.

I am appearing before you today as a private citizen, protesting the construction of Echo Park Dam in Dinosaur National Monument, a piece of real estate of which we all share in the ownership.

I agree with the opinion expressed in the National Park Service report that the effect of this dam would be deplorable. Of the many rewarding and delightful experiences I have had in our national parks and monuments, none was more rewarding nor more delightful than a 6-day boat trip which my family and I were privileged to take through the scenic river canyons of this national monument.

Senator ANDERSON. When did you take that, Doctor?

Dr. BRADLEY. That was a year and a half ago.

All of us who took the trip—14 people ranging in age from 9 to 76 years—are grateful that this lovely area, with its sandy beaches,

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friendly campsites, and singing rivers, is federally protected in the national-park system.

We sincerely hope that the Congress will continue to protect this area for the beautiful thing that it is.

The upper basin, however, wants and needs more water, and the primary purpose of this nine-dam storage project is to provide a means of getting it.

I am told power is to be a byproduct. No one objects to the aim—at least I do not—but whether it is necessary to build a dam at Echo Park to realize this aim has been hotly contested.

Various alternative plans have been proposed for achieving what seemed to be essentially the same result without this dam. Of these the Bureau of Reclamation has considered as legitimate only those which would provide roughly the same total storage capacity, and then has ruled them out because of the increased evaporation losses which presumably would result.

"Evaporation," wrote a bureau engineer, "was the decisive factor." He then pointed out that the increased evaporation loss at the Dewey alternate—120,000 acre-feet per year—was equivalent to the water required to maintain a city larger than Denver, Colo. The comparison is very impressive, indeed, and with it the Bureau rested its case for Echo Park Dam.

There can be no doubt that the Interior Department based its recommendation for this dam squarely on these evaporation estimates and this comparison to Denver's water needs.

Former Under Secretary Tudor told his chief that in his opinion if the dam were built the alteration of the area would be substantial, and if conflicting interests did not exist he would prefer to see the monument remain in its natural state.

Any power loss at the alternate sites, he said, was of secondary importance because it could be replaced by steam power at some increased cost. The choice, he concluded, was—

> simply one of altering the scenery * * * or of irreplaceably losing enough water to supply all the needs of a city of more than 600,000 people.

In his statement to the House Subcommittee on Irrigation last year, he said:

> In the final analysis, the increased losses of water from alternative sites is the fundamental issue upon which the Department has felt it necessary to give any consideration to Echo Park Dam and Reservoir.

I contend, however, that intentionally or not, this comparison to Denver's water needs is grossly misleading and not very illuminating.

In the first place, it is totally unrelated to the water budget involved here. There is no reference to the size of the total resource against which these "increased losses" are going to be charged.

Nor is there any mention of the magnitude of other similar wasteful losses in the same general area which are thought to be either acceptable or intolerable, in order that the uninitiated might have some further basis for comparison. Nor any estimate of when that last 120,000 acre-feet per year is likely to be needed. Nor any adequate discussion of the reliability of hydrologic data in general or evaporation estimates in particular for nonexistent reservoirs.

And yet, is not all of this information absolutely necessary for any decision as to whether or not this is an exorbitant price to pay to keep the monument in its present natural state?

Hence my remark that the bureau's comparison was not very illuminating.

Furthermore, the water economy of a single metropolis like Denver is obviously quite different from that of a large river basin comprising an area greater than New York, New Jersey, and Pennsylvania combined, and containing both farms and cities.

If the Bureau had used the present per capita consumptive use of water in the upper basin itself as the criterion, it would have concluded that the advantage of Echo Park over Dewey would be enough water saved to support an extra, not 600,000 people, but 18,000 people.

Senator ANDERSON. Do you have the figures on which you have based that?

Dr. BRADLEY. The population of the upper basin as I understand it is 325,000 people, and the present water use is somewhere between 2.0 and 2.5 million acre-feet annually. So this is on the basis of those two figures.

Still impressive, perhaps, but somewhat less so. And indeed, if the Bureau had used the present per capita water use for typical irrigated farmland in the vicinity the figure would have been 2,600. Even this reduces to 1,300 people if one makes the not unreasonable assumption that only half the diverted water will reach the farms.

Hence my remarks that the Bureau's comparison is grossly misleading since it represents more nearly an upper limit (for that part of the country) than an average, and does not suggest the range of variation.

Senator ANDERSON. Let me see if I understand. You are suggesting here that the difference between using Echo Park and the other locations is only enough water to support 1,300 people?

Dr. BRADLEY. If the basis is the present per capita use of typical irrigated farmland in the vicinity and if in addition one assumes that half the water will be lost on diversion——

Senator ANDERSON. Cannot you get it back down to an answer?

Dr. BRADLEY. On that basis; yes, sir.

Senator ANDERSON. You mean I have to stop and calculate all those other things. Can you tell me whether or not you are saying it is only supporting 1,300 people, the entire difference in the evaporation losses in the area? These people who live in a typical western town, Pueblo, Colorado Springs, are you trying to say that?

Dr. BRADLEY. No, sir.

Senator ANDERSON. What are you saying?

Dr. BRADLEY. I am saying if they live in farms this is the number of extra people that the water will support. If they live on a combination of farms and cities such as one now finds in the upper basin, if one uses the full consumptive use of water in the upper basin at the present time and divide that by the number of people who use it, one finds an amount of water that each person will require.

It is on that basis.

Senator ANDERSON. Go ahead.

Dr. BRADLEY. However, if the manner in which this evaporation argument has been presented and promoted is sufficient to raise serious doubts as to its ultimate overriding importance, a somewhat more

detailed analysis does nothing to dispel these doubts. This I will now try to demonstrate.

The question of reliability: For an evaluation of the worth of any set of figures, it is just as necessary to know something about their accuracy, i. e., the extent to which they may be considered meaningful, as it is to know the figures themselves.

To illustrate this remark with an absurd example, how much importance would the sporting world have attached to Roger Bannister's record breaking mile run if he had been timed with a sun dial? No measurement can be infinitely precise, nor can any calculation based on measurements.

Still less reliable will be calculations based one estimates and assumptions, and particularly so if, as in this case, the formulas are known to be inexact.

None of these remarks is intended to reflect any discredit on the Bureau's hydrologists, who may well be top men in their field. Their task, however, was a somewhat "iffy" one.

The evaporation formulas the Bureau used for the upper basin study—namely, evaporation pan formulas and relationships derived from them—will not consistently give results better than about 10 to 15 percent.

Senator ANDERSON. Now, will you explain what you mean by 10 to 15 percent? Are they only 10 to 15 percent accurate, or only 10 to 15 percent off?

Dr. BRADLEY. On the average they would be within 10 to 15 percent.

Senator ANDERSON. Of accuracy?

Dr. BRADLEY. Yes, sir.

Senator ANDERSON. Plus or minus 10 or 15 percent?

Dr. BRADLEY. Yes, sir; on the average. Half the time it would be better than that.

Senator ANDERSON. Then they would be 90 to 85 percent accurate?

Dr. BRADLEY. Yes, sir.

Thus, even if the nine reservoirs existed today so that the engineers could accurately measure at every reservoir each factor going into these formulas—i. e., water temperature, wind, humidity, and surface area—they could still not be sure how much water their system was evaporating to closer than about 100,000-acre-feet per year, enough water for another Denver, more or less.

But the situation is actually worse than this because the reservoirs are not yet in existence, so instead of measurements the Bureau has had to rely on estimates, assumptions, and educated guesses.

With a little effort one can convince one's self that the assumptions need be changed only slightly to lead to quite different results, and the differences compare rather favorably with Denver's water needs.

For example, an error of a little over 1 mile per hour in the assumed wind velocity at Glen Canyon affects the system evaporation estimate by approximately 100,000 acre-feet a year. That depends on the formulas you use. Some will be less and some more.

Similar changes occur if the water temperature is wrong by a few degrees, or if the dam height is altered by 5 percent.

Wind velocities were not measured at the reservoir sites, water temperatures are difficult to predict because they do not correspond to present air or river temperatures, and dam heights being the result

of preliminary studies are given in round numbers only and are subject to any change warranted by more detailed investigation.

The fluctuating surface areas of the reservoirs are also difficult to predict accurately because they will depend strongly on future climate, future flows, upstream diversions, and the future economy of the region, 75 years hence.

The Interior Department has argued that errors will apply equally to all reservoirs, and, therefore, the comparisons between any two reservoirs, e. g., Echo Park and an alternate, would still be "very dependable."

This is possibly true for defects in formulas, but I do not see how it can apply to the potentially more serious errors arising from faulty assumptions regarding wind, water temperature, humidity, prereservoir losses from the area to be inundated, dam heights, reservoir surface fluctuations based on a future economy, and so forth.

Indeed, I would think that the evaporation from every reservoir could have been overestimated or underestimated by an amount largely independent of the situation at any other reservoir, and if this is the case the difference in evaporation between Echo Park and an alternate should be less dependable than the estimate at either reservoir.

I therefore would accept the evaporation saving claimed for Echo Park only with the understanding that it could be pretty far from the true value in either direction.

These uncertainties do not, in my opinion, invalidate the evaporation argument for the Dewey alternate, although I do believe they render the argument academic for the High Glen alternate, for the difference, you know, is 25,000 acre-feet a year.

They do suggest to me, however, that the importance of this extra loss has been exaggerated.

The future economy of the upper basin cannot be pivotal on 120,000 acre-feet a year of water when the water resource itself is in doubt to a comparable extent.

Other wasteful losses. Waste should not be condoned, but we are after all talking about wasteful losses, and the problem here is to decide whether one particular among numerous other wastes is to be singled out as intolerable.

For example, the following are some wastes which are not considered intolerable:

1. The 7 Colorado River States are currently losing over 20-million acre-feet of water per year because of wasteful irrigation methods—enough for 200 Denvers.

Senator ANDERSON. Could you give us the figures on which that is based? Twenty million acre-feet a year. How much is there in the Colorado River?

Dr. BRADLEY. This is not from the Colorado River. This is the Colorado River States. There is not that much water in the Colorado River. This is the waste which was reported last year for the 7 river States.

Senator ANDERSON. Twenty million acre-feet?

Dr. BRADLEY. Exactly 23 million acre-feet. House hearings, page 772. I do not mean to imply here that these wastes are in the basin. I was not able to find so very much on that.

Page 772:

A Colorado agricultural and mechanical bulletin lists a seepage loss of water between diversion point and point of delivery to farms in the 7 Colorado Basin States at 22,927,000 acre-feet annually.

The breakdown is given and it shows how much water is lost during diversion.

Then this witness went on and he gives a list of references. Most of it is in the footnotes here. Dr. Louis Madsen, president of Utah State Agricultural College—well, I guess that is not too relevant. About 4 million acre-feet of water now is being diverted for irrigation, Dr. Madsen said, but half of it never reaches the farm, and the balance is used at only 50 percent efficiency.

This was partly the basis for my statement earlier as to the number of extra people that would be supported by this water. This is rather complicated because it is figures.

I will be glad to submit more detailed figures, if you wish, if you would like me to proceed, sir.

Senator ANDERSON. Yes. On this basis, New Mexico is diverting over 3 million acre-feet of water a year out of streams. I am just trying to calculate where they are finding 3 million acre-feet of water in New Mexico a year.

Dr. BRADLEY. Shall I proceed, sir?

Senator ANDERSON. Yes, go ahead.

Dr. BRADLEY. If but 1 percent of this could be salvaged, 200,000 acre-feet more water would be available to the West each year, more water than Echo Park's saving over Dewey.

Senator ANDERSON. Of course, you recognize that this table you refer to of this amount of water that you say is wasted, well over half of it is in the State of California alone. If you could just get California corrected they wouldn't ask for all of our water.

Senator KUCHEL. It is a difficult enough chore for me to get just one member of this committee corrected.

Dr. BRADLEY. I am only trying to point out that these wastes exist and no discredit is intended on people from California or the upper basin or anything. This is for the basis of comparison.

Senator KUCHEL. I am sure the witness states his position accurately, but I do not know whether many members of the committee share his statement.

Senator ANDERSON. Well, he introduced a figure. I am happy to note that California on the basis of what he says wastes more water than all the other States put together.

Senator KUCHEL. Maybe he could give a few reasons, Senator, based on the size, the number of people who are interested, the multiplicity of uses to which water is put in California.

I mean I think you would be able to find some reason for the greater amount of water which you would contend would be wasted there; could you not?

Senator ANDERSON. I think if you will examine the original document I seriously question whether that would contend that California is wasting 11 million acre-feet of water a year between the turnout of the river and the turnout to the farm.

Senator KUCHEL. At any rate, that is this witness' testimony.

Dr. BRADLEY. All I am referring to is the testimony that appeared last year.

Senator ANDERSON. That is the testimony of the representative of the Wildlife Federation. I do not see that he listed too much of it.

Dr. BRADLEY. I will be glad to look into this some more. I have nothing further than what is here. If this turns out to be wrong, I will be glad to delete all of this from my testimony.

Senator GOLDWATER. Is not the evaporation figure 1 percent per mile of transportation? I mean the loss figure.

Senator ANDERSON. We all recognize that when you are diverting into dirt ditches—we do not all have concrete-lined ditches in our part of the world—you have a water loss to be sure. But this figure he says is based upon a seepage loss from the diversion point to the point of delivery to the farm.

Dr. BRADLEY. I suppose much of that would be evaporated.

Senator ANDERSON. Very little of it would be evaporated loss. The irrigation ditch runs very rapidly from the point of diversion to the farm and I think it is hard to believe that 3 million acre-feet of water will be lost in any State between the point of diversion and the farm.

It is pretty hard to believe that nearly 12 million acre-feet of water is being lost each year that way in California.

You may proceed.

Dr. BRADLEY. Unless irrigation methods for this project are to be very different from those currently used, Echo Park's extra saving will be lost many times over getting this water on the land. Since the cost of lining irrigation canals is beyond the means of the farmers, perhaps this should be a reclamation service performed by the Federal Government.

2. Los Angeles in a lower basin State currently pours 450,000 acre-feet of water annually into the ocean. According to a Bureau official:

> This water could be treated and used for irrigation or municipal use if the users were willing to pay the relatively high price involved.

The price, whatever it is, should be compared to the price of getting water in other ways in the same area.

Senator KUCHEL. What are you talking about there, Doctor?

Dr. BRADLEY. This is the sewage effluent from the Los Angeles County in the city of Los Angeles.

3. Salt Lake City in an upper basin State, throws away 35,000 acre-feet a year into Great Salt Lake.

4. This storage project will of itself lose an estimated 850,000 acre-feet a year through reservoir evaporation, and the upper basin, which must pay for this loss, does not find it objectionable.

Senator ANDERSON. I do not think it is quite accurate to say we do not find it objectionable. We find it unavoidable. We cannot prevent the sun from picking up that water. We cannot stand there with an umbrella and say the sun will not shine on this lake today.

Dr. BRADLEY. Holdover storage is, of course, necessary if the upper basin is to use its full allocation of water and still meet its obligations downstream, so some evaporation is inevitable.

However, the 36 million acre-feet of active storage called for in this project is over 50 percent more than necessary for compact requirements—20 million acre-feet are needed according to Hoover, 23 according to the Bureau—so the evaporation is more than necessary by perhaps as much as 300,000 acre-feet a year.

The extra storage is, of course, for the purpose of producing power—I have not included the dead storage—which as Mr. Tudor pointed out in another connection could be produced in other ways.

I do not object to multiple-purpose projects, but isn't the choice here between altering the method of producing power, or the irreplaceable loss of enough water for three cities the size of Denver? And, if so, how did the evaporation argument ever become the fundamental issue at Echo Park?

5. It has been suggested and is now being checked, that evaporation from Lake Mead could be reduced by 100,000 acre-feet per year if water were released from near the surface rather than the cool depths. I have not heard the final results of this calculation, but if it should turn out to be correct, here is another comparable waste which in principle could be avoided.

In view of the number and the magnitude of these other wasteful losses currently thought to be acceptable, or at least not too intolerable, the evaporation argument sounds specious.

In any event, it is obvious that Dewey's extra loss can be more than made up in other ways.

The total resource: The upper basin's full share of the Colorado River, which this storage project is supposed to make available, is 7.5 million acre-feet a year—leaving out treaty obligations and the questions of compact interpretations.

The Bureau's plan will reduce this to about 6.6 million acre-feet a year because of reservoir evaporation. Whether Dewey is substituted for Echo Park or not will change this amount by only 1½ percent, half a tablespoon difference in every pint of water.

Or to look at it in another way, if the proposed project is authorized the upper basin will theoretically have enough water for 66 Denvers, if we borrow the Bureau's statistics, which amounts to about 20 percent of the present population of the United States.

If, on the other hand, Dewey is substituted for Echo Park there will still be enough water for 65 Denvers. It becomes then a choice between 65 and 66 Denvers.

Even if the total water resource could be guaranteed to such precision, what is it that makes the first case acceptable and the second case intolerable?

This, in my opinion, makes the evaporation argument seem academic, if not trivial.

The ultimate need: The upper basin presently uses 2.0 million acre-feet a year of Colorado River water. I am not sure whether it is 2.0 or 2.5. I found both in this testimony.

After the initial stages of the project are completed this figure will increase to over 3.5 million. Holdover storage becomes necessary if the use is to exceed 4.3 million.

No one predicts with certainty when the full allocation will be needed, but the Bureau's estimate is "75 years or more."

Therefore, the first time the upper basin can use that last 120,000 acre-feet a year which Echo will save and Dewey will not, is going to be in about 75 years according to the best estimates.

Long-range planning is laudable, but Echo Park Dam is, after all, a contentious matter and a great many people now living have objected to the dam.

It seems to me that the Bureau's "decisive factor" and the Department's "fundamental issue" amount to denying the Nation the opportunity to enjoy this area in its present natural state from now on and forever, in order to provide a benefit which cannot be provided by a substitute site, but which could be provided in other ways—e. g., by lining the irrigation canals—a benefit to start some 75 years or more in the future and permitting an ultimate population growth of only 1½ percent larger than otherwise.

And the final crowning irony is that even when that last 120,000 acre-feet a year has been squeezed out, the upper basin, according to the Interior Department, will still find itself far short of its "full economy"—whatever that may mean.

As long as the "full economy" is out of the question in any case, can we be sure that the people in that far distant future date would not prefer to have the park? Present indications are that the future will need more, not fewer, parks.

Summary: The Interior Department has based its recommendation for Echo Park Dam on a low evaporation rate as compared to alternate sites. I have questioned the importance and the validity of this argument for the following reasons:

1. The "increased losses at alternative sites" would support an extra 600,000 people, as the Bureau suggests, if they all happened to live in a city, but only an extra 2,600 people if instead they all lived on farms—which the Bureau neglected to mention.

For a typical mixture of the two the figure is about 1,800.

Regardless of which figure is the most realistic, it was misleading to give only the first figure since it represents more nearly an upper limit than an average and does not suggest the range of variation.

2. The "increased losses" are no longer than the uncertainties in the hydrologic data. Since the water resource cannot be guaranteed to this precision, neither can the future economy be planned to such accuracy. Therefore, the future of the upper basin cannot be pivotal on these losses.

3. The "increased losses" are very modest compared to other wasteful losses in the same general area, losses which could in part be avoided and which are not currently felt to be intolerable, or should I add at least not too intolerable.

4. These "increased losses" can be more than compensated for by reducing the waste elsewhere.

5. These "increased losses" will not affect the economy of the upper basin for at least 75 years, according to the best estimates. With or without these losses a full economy is out of the question anyway—according to the Interior Department's definition—so Echo Park's lower evaporation rate will solve no water problem.

6. The "increased losses" at alternative sites—not counting High Glen—amount to as little as 1½ percent of the total resource of the upper basin. Even if the resource could be guaranteed to such accuracy, the choice is between water for 65 Denvers and water for 66 Denvers. Is the difference too high a price to pay for protecting a priceless heritage?

Two final remarks.

First, I have used the Dewey alternate for my illustrations. I do this only because it is still considered a legitimate alternate to Echo

Park—as of last October—aside from the evaporation factor. I am not recommending its substitution for Echo Park because I am in no position to do so. The Bureau itself must decide how best to revise its project if Echo Park Dam is deleted.

Second, some will say that I have tried to minimize the importance of the loss by comparing it to the total resource, and other losses. But isn't this just the sort of comparison a person does make when he is trying to decide whether or not the price of some service or commodity is an extravagant one? Does he not relate the price to his bankroll and to the other expenses he has to meet, at the same time keeping in mind the value, intangible or otherwise, of the thing he wishes to buy?

Gentlemen, I deeply appreciate your having given me the opportunity to present this material in the public interest, as I see it. I hope I have been able to demonstrate why I believe that these evaporation estimates have been given exaggerated importance and do not constitute sufficient justification for sacrificing this unit of our national park system, Dinosaur National Monument.

Senator ANDERSON. Senator Kuchel, do you have any questions?

Senator KUCHEL. No questions, Mr. Chairman.

Senator ANDERSON. I will be interested sometime in your explaining how we are going to get top water off Lake Mead instead of the water deep down. We would have to have a floating inlet.

Dr. BRADLEY. I have not read the USGS report on this. I am not sure what the engineering problems would involve.

Senator ANDERSON. Anyhow, it is a very interesting statement and we thank you for your appearance.

Dr. BRADLEY. Thank you, sir.

(The following letter was subsequently received for the record:)

MARCH 10, 1955.

Senator CLINTON P. ANDERSON,
Chairman, Subcommittee on Irrigation,
Senate Committee on Interior and Insular Affairs,
Senate Office Building, Washington 25, D. C.

MY DEAR SENATOR ANDERSON: In the course of my testimony before your Subcommittee on Irrigation on March 3, 1955, with regard to the upper Colorado River storage project, you raised two questions which I promised to answer more fully in writing. The questions (as I remember them) and their answers appear below and I would appreciate it if you would make them a part of the record.

1. Question. What do you mean when you say that Echo Park's 120,000 acre-feet per year of evaporation saving relative to Dewey would support an extra 600,000 people using one criterion, 18,000 people using another criterion, or 2,600 using a third?

Answer. I was trying to bring out that the number of people who could be supported by 120,000 acre-feet per year of water depends on the type of economy one is considering. The Bureau says that this water is enough to maintain a city the size of Denver, that is, it would support 600,000 people if they all live in a city. Farmers need more water than city people so the same amount of water would support only about 2,600 people if they all live on irrigated farms. For what seemed to me to be a reasonable mixture of farms and cities I used the upper basin itself. For this particular economy, 120,000 acre-feet per year of water supplies the needs of 18,000 people on the average. (I computed this on the basis that the present population is 325,000 people and the present water use is 2.2 million acre-feet per year, about 0.147 persons per acre-foot per year, or 18,000 persons per 120,000 acre-feet per year.)

2. Question. What do you mean by "good to 10 percent"?

Answer. It is said that a measurement (or an estimate or a calculation) is good to 10 percent if on the average that measurement comes within 10 percent

of the true value, that is, if the difference between the measurement and the true value is on the average no larger than 10 percent of the true value. As an example, if the length of a 100-foot room can be measured to within 10 percent, any particular measurement should have a 50–50 chance of lying somewhere between 90 and 110 feet. The definition is admittedly somewhat arbitrary and sometimes a somewhat different definition is used. The one I used, however, is consistent with the discussion on evaporation in the Lake Hefner report (USGS Circular 229), basis for most of my remarks on evaporation calculations.

Sincerely yours,

RICHARD C. BRADLEY,
Department of Physics, Cornell University, Ithaca, N. Y.

Senator ANDERSON. Mr. Howard.

Senator KUCHEL. Mr. Chairman, as Mr. Howard appears, I would like to take a very few moments by way of introduction to what his testimony and the testimony of others who now will be presented to speak will entail.

Mr. Chairman, the legislation before this committee has been urged by most of the witnesses up to this time. Those who will follow will exercise their rights as American citizens and as representatives of public agencies in a State which I have the honor to represent, and will endeavor in a reasonable manner to demonstrate to this committee and to the Senate and thereafter to the Congress and to the President the grave hazards which the bill before us would do to rights which were acquired by California and the other States in the lower and upper Colorado River Basin as a result of the 1922 compact.

That compact, Mr. Chairman, constitutes a part of the law of the Colorado River.

And here first in a series of individuals from my State to speak is a distinguished California lawyer, Mr. James H. Howard, who is the general counsel of the Metropolitan Water District of Southern California.

I am glad, Mr. Howard, to welcome you to testify before this committee.

Mr. HOWARD. Thank you, Senator.

STATEMENT OF JAMES H. HOWARD, GENERAL COUNSEL, METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

Mr. HOWARD. Mr. Chairman and gentlemen of the committee, the chairman of the board of directors of the metropolitan water district would be here were he not temporarily disabled by surgery and at present occupies a plaster cast. He would find it impossible to be here, but I would like to say that Mr. Joseph Jensen, the chairman of our board, would be here in opposition to this bill were he able to do it.

In my feeble way I will attempt to state some of the reasons why the Metropolitan Water District of Southern California finds it necessary to appear in opposition to the bill.

I have had the pleasure of appearing before this committee in other connections, but was not here when this bill was considered last year.

For the purpose of indicating the nature of our interest in the bill, I will state as briefly as possible the character, scope, and purposes of the Metropolitan Water District and its relation to the waters of the Colorado River system.

The district is a public and municipal corporation, more limited in its powers than the ordinary city, but similar in its corporate structure.

In recent years, due to the increasing water requirements, the district has been territorially expanded to include an area of about 2,700 square miles, lying on the coastal plain of southern California, extending from the Santa Monica-Los Angeles area on the north to the San Diego area on the south.

There are 66 incorporated cities within the district. Its population exceeds 6 million, and its assessed valuation is approximately $8 billion.

The district was incorporated in 1928 for the express purpose of financing the construction, operation, and maintenance of works to import water from the Colorado River for use on the coastal plain of southern California. It was designed to provide an instrumentality by which the metropolitan area of southern California could avail itself of the benefits of the Boulder Canyon Project Act. That act, as you will recall, was adopted by the Congress in December of 1928, the same month in which the metropolitan water district was incorporated.

In 1931 the people of the district voted a bond issue in the sum of $220 million for the construction of the Colorado River aqueduct. The bonds, in the first instance, were sold to the Reconstruction Finance Corporation, there being no public municipal-bond market at that time.

Later, however, the RFC sold all of the district bonds to private and institutional buyers. There is no Federal money in the Colorado River aqueduct. It was constructed, and is sustained, by money derived from local taxation and from the sale of water. Other than current water and power bills, we owe nothing to the United States.

In 1931 the district entered into an agreement with other California water-using agencies relating to the respective priorities in the use of Colorado River water. Because of long-established rights in agricultural areas, particularly by the Imperial Valley and the Palo Verde area, the district accepted a junior position in the priority scale and entered into a water-delivery contract under the Boulder Canyon Project Act, executed on behalf of the United States by the Secretary of the Interior and calling for the delivery of specified quantities of water from storage at Lake Mead, in accordance with the California priorities agreed upon.

The district also holds a contract for electrical energy from the project, the use of such energy being limited to pumping water into and in the Colorado River aqueduct.

The area of the district has become an extremely important defense area. Not only are great aircraft industries centered in the Los Angeles and San Diego areas but many other industrial developments have taken place, adding to the Nation's defense potential which must be sustained with an adequate water supply.

For these reasons the district is vitally interested in the continuity of water supply in the lower basin from the Colorado River system, both as a source of domestic and municipal water, and a source of power.

We now find that supply threatened by proposed legislation predicated upon a distorted interpretation of the Colorado River compact. That is why I am here.

Senator ANDERSON. You will explain as you go along why you think your supply is threatened?

Mr. HOWARD. I will. That is the purpose of this statement.

The Boulder Canyon Project Act had been pending in various forms before the Congress for about 10 years prior to its adoption in 1928.

The States in the upper reaches of the Colorado River system resisted the passage of the act in its first stages because they believed, with considerable justification, that development in the lower basin and the use of water for domestic, agricultural, and power purposes would establish priorities inconsistent with the development of the upper basin. It was about that time that the case of *Wyoming* v. *Colorado* (259 U. S. 419) was decided, in which the Federal Supreme Court held that, as between States applying the appropriation doctrine, first in time in the use of water would be first in right, regardless of State lines.

As a result of this situation, the Colorado River compact was negotiated and signed in draft form by the negotiators at Santa Fe, N. Mex., in 1922. The compact abrogates the law of appropriation, as between the upper and lower basins of the Colorado River system, and reserves to the States of the upper basin, in perpetuity, the right to the beneficial consumptive use of certain waters of the system. This was one of the commitments which California was required to make as a condition precedent to the development of the Boulder—now known as the Hoover—Dam project.

Without going into detail as to the history of the compact, suffice it to say that ultimately 6 of the States involved, including California, waived the requirement of 7-State ratification and ratified the compact as a 6-State compact. This was done in the light of Arizona's failure and refusal to approve and ratify the compact.

When the bill which became the Boulder Canyon Project Act was on the floor of the Senate, and because Arizona had refused ratification of the compact, an amendment was developed which called upon California to make another commitment with respect to the use of Colorado River water.

It was provided in section 4 (a) of the act that in the absence of a 7-State compact, and as an alternate thereto, the project act might be proclaimed effective upon 6-State ratification, including California, and the adoption by the California Legislature of an act agreeing, for the benefit of the other States of the basin, to limit use of Colorado River system water in California in a manner set out in the project act.

At the end of the 6-month period prescribed by the act, the President proclaimed that there was no 7-State compact, that 6 of the States, including California, had ratified, that California had done what was required of her under the project act, that is, adopted the Limitation Act.

Upon the basis of the facts so found, the Presidential proclamation put the project act into effect as of July 25, 1929.

Senator ANDERSON. What was the water requirement under the Limitation Act?

Mr. HOWARD. The Limitation Act, which is in the exact words of the project act, limits the use of waters from the Colorado River system in California to 4,400,000 acre-feet per annum of the waters apportioned to the lower basin by article III–a of the Colorado River compact, plus one-half of excess or surplus water unapportioned by the compact, all of course subject to the compact.

Senator ANDERSON. So if there was no surplus water there would be a limitation of 4,400,000 acre-feet?

Mr. HOWARD. If there were no surplus water—as counsel pointed out the other day, the word "surplus" is a rather confusing word in this connection because it is used in many ways, but if you mean by surplus waters in excess of the waters apportioned by article III–a, we are relying upon that one-half of excess or surplus being available for use in California under the Limitation Act.

Senator ANDERSON. If the upper basin States had been allowed to develop, or had been able to develop as the lower basin States have developed, if Arizona was using its water to the same degree that California was using its water over the past 30 years, there would have been no surplus water, would there?

It has only been running an average of 15 million acre-feet.

Mr. HOWARD. There would have been some. I am getting into the engineering field here, but my memory is that over the last 30 years the average output of water crop of the entire system has been more nearly 16 to 17 million acre-feet. But I would be subject to correction on that by the engineering group.

Senator ANDERSON. In any event, there would not be much surplus if there were 16 to 17 million acre-feet. If you take 15 million acre-feet and add a million acre-feet for some extra use, and then add 1½ million acre-feet for Mexico, there would not be much surplus from 16 million acre-feet, or even17 million acre-feet.

Mr. HOWARD. As the chairman pointed out when Governor Johnson was testifying, the gentlemen who framed the compact were evidently working on the theory that the output of the river was more nearly 21 million acre-feet a year, but more recent measurements have indicated that that was an overestimate.

Seantor ANDERSON. Then we come back to the limitation of 4,400,000 acre-feet.

Mr. HOWARD. Then when you take into consideration the additional factor that the United States has guaranteed to Mexico a million five hundred thousand acre-feet, which will probably require more nearly 1,700,000 acre-feet to serve because the water has to be delivered in accordance with schedule and the control points are so remote from the border that we will have to deliver more than the 1,500,000.

That factor combined with reduced estimates of the available water crop of the river, creates a very tight situation in the lower basin.

We now have two agreements to consider: (1) the Colorado River compact, and (2) the agreement between California and the United States made for the benefit of all of the other States of the basin, limiting the California use of Colorado River water. We have dubbed the latter agreement the "Statutory Compact."

That is evidenced by reciprocal legislation, the Boulder Canyon Project Act on the one hand, and the California Limitation Act on the other.

The meaning and effect of these two agreements are now involved in litigation between Arizona and California, litigation to which the United States has become a party by intervention, as has the State of Nevada.

At the time the Metropolitan Water District entered into its contract with the United States for Lake Mead water, accepted a junior position in the scale of California priorities, and undertook to construct its costly works, there were certain generally accepted meanings attached to the Colorado River compact and the statutory compact.

In reliance upon these interpretations the district voted a $220 million bond issue; sold its bonds and proceeded with the construction of costly works and developed an extensive economy based on the full effectiveness of its water-delivery contract.

The bill before you pays lipservice to the Colorado River compact, but the availability of water to serve the projects sought to be authorized has been computed on the basis of a reading of that document which departs radically from the meaning and intent expressed in the compact itself and stated of record by representatives of the several States at the time of ratification.

These same distortions of the compact are now before the Supreme Court in *Arizona* v. *California*.

Senator ANDERSON. I am a little interested in the statement that it pays lipservice to the Colorado River compact. Ten members of the United States Senate were on it. Are you trying to say that they are really not honest in what they are doing?

Mr. HOWARD. Far be it from me to say——

Senator ANDERSON. What does this say?

Mr. HOWARD. I am talking about the bill, itself. The bill says that everything under the bill shall conform with the Colorado River compact. But when you read the reports put out by the proponents of the project, we find that the meaning of the Colorado River compact which the proponents rely on is not the meaning of the compact as it was relied on and ratified and acted upon by the California agencies.

Senator ANDERSON. You mean the people in the upper basin are as overenthusiastic in that regard as the people in the lower basin are overenthusiastic in the other regard?

Mr. HOWARD. I would hardly accept that paraphrase.

Senator ANDERSON. I am having a little trouble with paraphrasing, myself.

Senator KUCHEL. It is not confined geographically because you and the Governor of Colorado entered into a rather long discussion of the interpretation of parts of the compact.

Senator ANDERSON. This is quite different from that. He says the bill on which the name of the Senator from Arizona and my own are attached and many other Senators pay lipservice to the compact.

Now, in order to prove that you say somebody out in the area who is a proponent of the project has taken a somewhat different view, have you seen where the authors of the bill and the Members of the Senate take a view contrary to what the Colorado compact is?

Mr. HOWARD. If the Senator finds the word "lipservice" offensive, I will be happy to strike those words.

Senator ANDERSON. Over on the floor we get very touchy if somebody imputes motives to Senators while in a hearing you are permitted to impute him as much as you wish.

I wonder if it is the best term.

Mr. HOWARD. If you find it offensive, it certainly is withdrawn.

Senator ANDERSON. I do not find it offensive, if you do not.

Go ahead.

Mr. HOWARD. What I am trying to say is that the Bureau of Reclamation reports, the upper basin compact, and the testimony before this committee in favor of the bill, have been put forth in reliance upon a reading of the Colorado River compact which presents an entirely different water picture from that relied upon by California, and the Metropolitan Water District at the time we proceeded with our work.

Senator ANDERSON. You say the upper basin compact.

Mr. HOWARD. The upper basin compact. I will come to that in a moment.

Senator ANDERSON. All right. Go ahead.

Mr. HOWARD. In the pending litigation there are 11 or 12 issues of interpretation which affect the basic meaning of the Colorado River compact and which will affect the amount of use of apportioned water of the Colorado River system available to the States of the upper basin and the correlative amount upon which the lower basin can rely.

I refer to *Arizona* v. *California*.

I will not go into all of these issues, but will discuss two of the major questions which have a substantial and direct bearing upon the availability of water for beneficial consumptive use in the upper basin, and the resultant availability of water for use in the lower basin. It is because of the distortion of the meaning of the Colorado River compact, evidenced in part by the Bureau of Reclamation and the Department of the Interior in support of the pending legislation, that we find it necessary to appear here in opposition to the bill.

In addition to the questions of compact interpretation now before the Court, we find an additional uncertainty interjected into the situation by the position of the United States in the pending litigation, particularly that relating to water uses by Indians and Indian tribes.

I will mention that point somewhat more fully later, but turn now to two basic questions of interpretation in which the States of the upper basin have departed from the meaning of the compact as it was understood and relied upon by California agencies, including the Metropolitan Water District.

The compact apportions water to the upper and lower basins, respectively, in terms of "beneficial consumptive use." That phrase is not defined in the compact.

However, at the time the compact was made, Mr. Delph Carpenter, the commissioner from the State of Colorado, and one of the authors of the document, made a report to his legislature which was reprinted in the Congressional Record, 70th Congress, pages 577–586, December 14, 1928. Mr. Carpenter said:

> The term "beneficial consumptive use" is to be distinguished from the amounts diverted from the river. It does not mean headgate diversions. It means the

amount of water consumed and lost to the river during uses of the water diverted. Generally speaking, it is the difference between the aggregate diverted and the aggregate return flow. It is the net loss occurring through beneficial uses.

Later in a supplemental report Mr. Carpenter elaborated on the point, saying:

In my original report (printed in the Senate Journal of January 5, 1923)—

he was referring there to the State legislature—

I discussed and defined the term "beneficial consumptive use." In addition to the discussion there contained, I might add there is a vast difference between the term "beneficial use" and the term "beneficial consumptive use." A use may be beneficial and at the same time nonconsumptive, or the use may be partly or wholly consumptive. A wholly consumptive use is a use which wholly consumes the water. A nonconsumptive use is a use in which no water is consumed (lost to the stream). "Consume" means to exhaust or destroy. The use of water for irrigation is but partially consumptive for the reason that a great part of the water diverted ultimately finds its way back to the stream. All uses which are beneficial are included within the apportionments (i. e., domestic, agricultural, power, et cetera). The measure of the apportionment is the amount of water lost to the river. The "beneficial consumptive use" refers to the amount of water exhausted or lost to the stream in the process of making all beneficial uses.

As recently defined by Director Davis of the United States Reclamation Service, it is the "diversion minus the return flow" (Congressional Record, Jan. 31, 1923, p. 2815). Water diverted and carried out of the basin of the Colorado River by the Strawberry, Moffat, or other tunnels, or by canal into the Imperial Valley, is wholly consumed as regards the Colorado River, because no part of it ever returns to that stream system.

Senator ANDERSON. Does that apply also to water that is diverted also out in the Los Angeles district?

Mr. HOWARD. Yes; that water never returns to the system. It is a transmountain diversion.

Now, we find in the upper Colorado River Basin compact of 1949, a provision, article VI, that consumptive use shall be determined by the—

inflow-outflow method in terms of manmade depletions of the virgin flow at Lee Ferry—

unless the commission set up in the compact to administer its terms, by unanimous action shall adopt a different method of determination.

By this provision, an attempt is made to convert the Colorado River compact from a compact relating to the entire Colorado River system, which by definition includes tributaries, to a main-stream compact. The States of the upper basin do not propose to measure their consumptive use by the amount of water burned up or lost in the process of use in the manner described by Mr. Carpenter, but to determine the depletion of the river at a point on the main stream many miles from the actual places of use.

The most outstanding illustration of this distortion of the compact is the effect on transmountain diversions. Under the definition advanced by Mr. Carpenter, water diverted out of the basin was 100 percent consumptively used, because none of it could ever return to the stream system.

Under the method now advocated in the upper basin, water which would have been lost by evaporation, seepage, or otherwise, between the point of transmountain diversion and Lee Ferry, would not be considered as consumptively used.

In other words, accepting the measure of consumptive use by depletion at Lee Ferry reduces the charge for transmountain diversions from the 100 percent advocated by Mr. Carpenter, to a lesser figure represented by estimated losses between the point of diversion and Lee Ferry.

In other ways the upper basin States now propose to use salvaged and conserved water without charging themselves for its beneficial consumptive use under the compact. Only the effect at Lee Ferry is considered.

The result of the change in the concept of beneficial consumptive use reflected in acre-feet per annum has been variously estimated, but is probably between 300,000 and 400,000 acre-feet per annum additional water used in the upper basin without charge.

Another illustration of the attempt on the part of the States of the upper basin to distort the compact is in the use of cumulative averages as to the measure of beneficial consumptive use instead of making that determination on an annual basis as provided in the compact.

Article III–a of the compact apportions water in terms of beneficial consumptive use per annum. Water used in any one year in excess of that amount should be classed as use of surplus. That means surplus over III–a water.

On page 152 of House Document 364, which is the Interior Department's report on the Colorado River storage project, appears a table which demonstrates the point. The table contains a column entitled "Virgin Flow of the Colorado River at Lee Ferry," and a second column entitled "Ultimate Use of Upper Basin Apportionment."

The latter, carrying on the erroneous meaning of "beneficial consumptive use" is explained in a note to refer to—

> use apportioned by Colorado River Compact measured in terms of manmade depletions at Lee Ferry.

The table covers a period from 1914 to 1947 and shows depletions exceeding 9 million acre-feet in the years 1914, 1917, 1920, and 1921—lesser depreciation in other years—reaching a low in the year 1934 of 4,480,000 acre-feet.

The table shows an average ultimate use in terms of depletion at Lee Ferry of 7,500,000 acre-feet per annum during the period 1914–45.

The authors of the report and the proponents of the upper Colorado River Basin storage bill obviously are working on the theory that the apportionment made by article III–a was made in terms of averages rather than in terms of uses per annum. They take the position that in 1 year, depletion in the amount of 9 million acre-feet may properly be treated as use of apportioned water, if, in another year, 6 million acre-feet is so used, with a resultant average of 7½ million acre-feet.

Over the period covered by the table referred to, this method of computation results in an increase in the use of water treated by the upper basin States as apportioned, from an average of 6,200,000 acre-feet, if figured on an annual peak of 7½ million, to 7½ million acre-feet if figured on the cumulative average basis.

These changes in the meaning of the compact, as understood and relied upon by California at the time of its ratification and relied upon by the Metropolitan Water District at the time of execution of its water delivery contract and the investment in its physical works, have a direct bearing upon the water available for use in the lower basin.

The total difference is reckoned as aggregating approximately 1,500,000 acre-feet per annum.

This situation, combined with the guaranty made to Mexico in 1945 of 1,500,000 acre-feet per annum, creates an intolerable situation in the lower basin. The Metropolitan Water District cannot acquiesce in the enactment of congressional legislation predicated upon false assumptions with respect to the availability of water for use in the upper basin, those assumptions of availability being predicated upon a compact twisted out of shape by interpretations unheard of at the time the obligations of parties to the compact, were assumed.

Senaor ANDERSON. Were any other interpretations made at the time of the compact?

Mr. HOWARD. There are others which I think will be more elaborately discussed by Mr. Ely. These are the only two which I intend to mention here.

Senator ANDERSON. You say these interpretations are unheard of.

Mr. HOWARD. They were unheard of at the time the compact was approved by California.

Senator ANDERSON. Can you illustrate an interpretation that was made that gives a different meaning to the beneficial consumptive use at the time the compact was made? You say now the upper basin States have adopted a new and novel theory of consumptive beneficial use, that these interpretations were unheard of at the time the compact was entered into.

Do you know a different interpretation of consumptive beneficial use that was heard of at the time the compact was entered into?

Mr. HOWARD. The only one I know about is the one that was expressed by Mr. Carpenter, the beneficial consumptive use being the water loss in the process of use and measured in most instances by diversions less return flow.

Senator ANDERSON. If you are willing to take Mr. Carpenter as your complete witness why not take him on the 7½ million feet in both basins as well?

Mr. HOWARD. I don't quite follow the meaning of that.

Senator ANDERSON. If your theory is followed out completely the lower basin States will get 7½ million and the upper basin States will get that they had water rights to in 1922 and never more than a million acre feet above that. He believes there was a division made. He did not believe there was a one-sided document that confirmed existing water rights in the upper basin States and gave them no extra water yield, at all to California and Arizona.

Mr. HOWARD. I have never read the compact in that fashion.

Senator ANDERSON. You contend for that interpretation.

Mr. HOWARD. I contend there are two covenants made in the compact which are separate and relate to different things. That is, there are more than 2, but the 2 that I am contrasting, 1 was an apportionment of beneficial consumptive use made to the upper and lower basins respectively.

There is another covenant that relates to the depletion of the river at Lee Ferry which does not relate to water burned up in the process of use but refers to an entirely different thing; that is water flowing in the river at a given point. There are those two covenants.

Senator ANDERSON. You think the second one completely supplants the first?

Mr. HOWARD. Not completely; no. The two run concurrently. The more restrictive one would control.

Senator ANDERSON. I am just interested in how much reliance you place on Mr. Carpenter on this point and how little reliance you place on the other point.

Mr. HOWARD. I don't think you will find anything in Mr. Carpenter's statement that indicates that the guaranty as it is expressed of 75 million acre-feet every 10-year period is in any way subordinated to article III–a.

If you can find that in Mr. Carpenter's statement, I will be glad to see it. They are two separate covenants.

As remarked here the other day, I think they were both made on the basis of erroneous assumptions as to the availability of water.

Senator ANDERSON. I know they were. I discussed plenty of times with Mr. Carpenter what he was doing in Santa Fe at the time he was doing it. Realizing how wise he was, I do not think he thought he was bargaining away the future of his State.

Mr. HOWARD. Whatever Mr. Carpenter may have had in mind, I don't know whether he was the author of that particular new language in the compact or not. That compact went through quite an evolution during the year 1922, with an extensive series of hearings. I think there were 26 or 28 meetings of the Colorado River Commission, the compact took various forms during that development.

Senator ANDERSON. And never a section was finished that did not have the refining influence of Mr. Carpenter.

Mr. HOWARD. That may be correct. I wasn't there. As the compact was written there appear to be these two separate covenants and I can imagine circumstances in which the covenant of subdivision E would control over the apportionment made by article III–a, but the two would run concurrently and the more restrictive would control under any given circumstances.

Passing on to another feature of this discussion:

Another disturbing element in the picture relates to the uses of water by Indians and Indian tribes. The Colorado River compact contains a provision that—article VII:

> nothing in this compact shall be construed as affecting the obligations of the United States of America to the Indian tribes.

In the report to which I referred earlier, Mr. Delph Carpenter of Colorado made the statement that article VII was put in for the purpose of protecting the obligations of the United States to the Indian tribes, and avoids necessity of conditional ratification of the compact by the Congress.

He added that:

> * * * the apportionment to each basin includes all such necessary diversions.

The States of the upper basin, in their compact, have followed the principle stated by Mr. Carpenter and have agreed that the use of water by the United States for its wards is chargeable against the State wherein such water is used.

I am happy to say in that provision we are in thorough accord with the upper basin States. We find an element of harmony.

However, in its petition of intervention filed in the action now pending between Arizona and California, the United States alleges that:

* * * the rights to the use of water of the Indians and Indian tribes are in no way subject to or affected by the Colorado River compact.

And, further, in the same paragraph, alleges that:

* * * the aggregate of the claims of the parties to this cause far exceeds the supply of water available under the Colorado River compact to the lower basin of that river, and to the claims asserted by the parties adverse to the rights to the use of water in the Colorado River system of the Indians and Indian tribes in the States of Arizona and California. The United States of America further alleges that the conflict among the parties to this cause directly and adversely affects the rights to the use of water in the Colorado River system of the Indians and Indian tribes in the States of Arizona and California, and that until the respective rights of the parties to this cause and the rights of the Indians and Indian tribes are determined, the United States of America will be in grave doubt and cannot exercise the claims which it asserts for itself and on behalf of the Indians and Indian tribes or perform its duties in connection with those rights, responsibilities, and obligations in regard to the Colorado River without great hazard to itself and to the parties themselves. * * *

The allegation of the pleading leaves us in serious doubt as to the position to be taken by the United States.

The flat statement that the rights to the use of water for the Indians and Indian tribes are in no way subject to or affected by the Colorado River compact may be read to mean that the water apportioned by the compact is in addition to and comes after the satisfaction of all Indian claims.

In the course of a pretrial conference conducted at Phoenix, Ariz., on October 5, 1954, counsel for the Government, Mr. Rankin and Mr. Veeder, were present. The discussions centered around a statement of the issues to be determined. In the course of the discussion Mr. Ely, representing the State of California, said:

* * * As to some of these issues, particularly those relating to the Indians you just mentioned, I might as well say now that we want some clarification of the Government's position at an appropriate time, perhaps in this statement of issues, as to whether they claim that the Indian uses are inside or outside the Colorado River compact; not only just what and where and how big these Indian claims are, but whether they are charged to the State in which they are located or whether they are outside of and ahead of the compact. We think that is one of the things that has to be determined before we get into a presentation of testimony.

Later in the proceedings the special master appointed by the court to hear the case addressed this question to Mr. Rankin, counsel for the Government:

What do the Indians claim?

To which Mr. Rankin responded:

That is one of the things I am going to undertake to present to you along with the issues.

Mr. Kane, one of the counsel for the State of Nevada, then said, without being in any way contradicted:

For the benefit of Government counsel, I am 1 of the outsiders looking in, but for some 10 years I advised the Indians and I merely state this with no point of criticism, but I don't think there is any Government policy on what the rights of the Indians may be. I don't know what department or agency in the Government to go to, certainly not the Indian Service, and in your pleadings you haven't made that too clear and I think, as Mr. Ely has pointed out, that is a very important issue and that may have to be determined in advance of either California's or Nevada's answers. I wouldn't know from the pleadings and experience I have had with the Indians what is being claimed in their behalf.

Whether the claims of Indians are inside or outside the compact has a substantial bearing on the availability for use of the waters apportioned to the upper and lower basins, respectively, by the Colorado River compact. In its pleading, the United States sets up the Indian claims in Arizona on the main stream and the Gila as aggregating about 1½ million acre-feet per annum in terms of diversion.

That would probably mean a benficial consumptive use, as we understand the term, approaching a million acre-feet.

In the States of the upper basin, Colorado, New Mexico, and Utah, the ultimate annual diversions for Indian uses were set up by the Interior Department in a comprehensive report on the Colorado River, dated March 1946, page 261.

In Colorado the ultimate acreage was set up as 20,350 acres, with a diversion duty of 72,750 acre-feet per annum.

In New Mexico, the ultimate acreage is set up as 113,000 acres and the ultimate diversion as 665,000 acre-feet per annum.

In Utah the ultimate acreage is set up as 99,085 and the ultimate diversion duty as 298,510 acre-feet per annum.

Here again, the uses are expressed in terms of diversion rather than beneficial consumptive use.

However, on the basis of the consumptive use of 1.5 acre-feet per annum, a consumptive use of three hundred and eighty-odd thousand acre-feet per annum would result.

If such use is not to be classed as use of apportioned water, but is to be taken out of the stream system ahead of apportioned water, the availability of water for use in the lower basin is affected in approximately the amount mentioned; that is, 380,000 acre-feet per annum.

Obviously, what is true with respect to the Arizona-California controversy would be true with respect to the upper basin; that is, if the Indian claims in Arizona come ahead of the compact, the same would be true in Colorado, New Mexico, and Utah.

With this uncertainty confronting us, the Metropolitan Water District of Southern California cannot acquiesce in, and must oppose, the adoption of congressional legislation predicated on the proposition that the Indian uses will be charged against the State in which such uses are made.

We agree with the position taken by the upper basin States in that particular, but so long as the United States takes, or reserves the right to take, a different position, computations as to the availability of water cannot be depended upon.

For the reasons herein outlined, and for the purpose of protecting the Metropolitan Water District of Southern California, in the full use of its contract water, we urge that the enactment of this legislation be deferred at least until we find out what the Supreme Court is going to do in the case of Arizona versus California now pending.

I move to strike the words "lip service," Mr. Chairman.

Senator ANDERSON. We are accustomed to being shot at. It does not hurt us if it does not hurt you.

Would it help if the Department of the Interior claimed that the diversion to Indians were headgate diversions so the loss would be much less?

Mr. HOWARD. I think I made that statement that at least in the Federal pleading the Indian uses in Arizona are set up, and in Cali-

fornia, as diversions rather than as beneficial consumptive use which, as I have tried to say, we consider to mean diversions less returns.

So the actual use is considerably less. Those figures I picked out of that comprehensive report of 1928, are set up in terms of diversion and just what the beneficial consumptive use would be does not appear from that report.

However, going back to the A. P. Davis report, made really the foundation of the Colorado River compact, I took advantage of 1.5 acre-feet per annum as representing the consumptive use, that is diversions less return, and figured it on an acreage basis rather than a diversion unit.

Senator ANDERSON. This bill which is before the committee would authorize the depletion of the stream by about 1½ million acre-feet annually at Lee Ferry.

That, added to the existing diversions and in authorized projects would make a total diversion in the upper basin States of about 4,400,000 acre-feet.

Mr. HOWARD. Did the Senator use the word "depletion" or "diversion"?

Senator ANDERSON. Depletion. The total depletion of about 4,300,000 acre-feet. It is your testimony you think that is so much for the upper basin States as to become dangerous to the State of California.

Mr. HOWARD. Combined with the recital which is in the bill, that is the intent of the Congress, to proceed on the same theory to the full depletion, using the word "depletion" in the way the upper States now use it, at Lee Ferry, to 7½ million acre-feet, I do consider it a hazardous step.

I do not think we can make any estimates with any dependability at all until some of these questions now pending in the Court are answered, and particularly until this Indian question is answered.

Senator ANDERSON. Put it another way: California's self-limitation act was to restrict it 4,400,000 acre-feet.

If this project were in the bill and were enacted, the total depletion of the four upper basin States would be less than the amount that California is entitled to under the self-limitation act and about a third less than California is now using. You still think that is too much for the upper basin States?

Mr. HOWARD. Well, in quantity it is a rather difficult question to answer because of these uncertainties that come into the computations.

Senator ANDERSON. It was not when California limited itself.

Mr. HOWARD. May I say this, Senator: That you gave a part of the California limitation act and this is also a question pending before the Court, we read that limitation act as 4,400,000 acre-feet of water apportioned to the lower basin by article III–a of the compact plus one-half of excess or surplus water unapportioned by the compact which we consider to include the million acre-feet referred to in article III–b, and we have made contracts that were acquiesced in by the Congress, in fact, ratified by the Congress later, in which we have contracted for the use of more than 4,400,000 acre-feet to the extent of, roughly an additional million, 962,000 to be exact, adding up to a contract use in California of 5,362,000 acre-feet per annum.

We rely upon the availability of that B water as a part of the excess or surplus so that the one-half to which we are limited would be sufficient to serve those contracts.

Senator ANDERSON. You do not think that was by any chance, then, the Gila River water?

Mr. HOWARD. I say "No," it was not. The Court has already held that that water is available to the lower basin not exclusively to Arizona.

Senator ANDERSON. Now, what legal right do you think you have to use the surplus water within the apportioned amount? Why do you say it is surplus water that you think will entitle you when it is within the apportioned amount of the total of 15 million acre-feet?

If you are talking about surplus water, there cannot be any until you are over the 15 million plus the 1 million acre-feet.

Mr. HOWARD. There you run into the peculiar computation that arises out of this limitation act.

Senator ANDERSON. Is it your contention that if you can keep the upper basin States from ever using any water that that becomes surplus water and you can have it?

Mr. HOWARD. No.

Senator ANDERSON. It sounds like it, does it not? How do you say you get up this extra water as surplus water? We know the flow of the stream; we have to be guided a little bit by experience, do we not? We have a better chance than those men who were sitting up in Bishop's Lodge above Santa Fe trying to divide this water.

We have seen some 30 years of experience and good measurements and we see the flow of the river is not sufficient over a 30-year period to take care of 7½ million acre-feet to the upper basin, 7½ million acre-feet to the lower basin, 1 million acre-feet of the III-b water, plus 1½ million acre-feet which the Congress, I think maybe unwisely, but nonetheless did, give to Mexico.

That is 17½ million acre-feet.

No figures exist which show that the flow over 30 years is that large. Where will there be any surplus water?

Mr. HOWARD. I would prefer that these matters be discussed with the engineers who are supposed to have analyzed all these figures. I will give you my impression.

Senator ANDERSON. Yes. You are using the term. I want to see what you thought the surplus water was. I want to see if you thought there was part of the 7½ million acre-feet.

Mr. HOWARD. As we use it, it includes the III–b water, so when we get over 4,400,000 we get into the III–b water.

Senator ANDERSON. I will not quarrel with you on that. That is your fight with Arizona. That is what I am trying to get to.

If you are referring to that as surplus water—I did not think the III–b water had been called the surplus water particularly in the compact.

Mr. HOWARD. We have treated it as such and it was treated as such by the Interior Department at the time our contract was negotiated in 1930, 1931, so there is an opportunity for us to get over the 4,400,000, which is III–a water, into an additional part of the III–b.

If the decision of the Supreme Court should hold that that III–b water was not available for use in California, our position would be even worse than we expect.

Senator ANDERSON. Your misfortune would be our good fortune.

Mr. HOWARD. I know you would not want us to suffer on your account. We feel if the compact is adhered to by the States of the upper basin in the way in which we read it and interpreted it at the time we assumed our commitments, that there will be water available in the lower basin to serve the California water delivery contracts.

Senator ANDERSON. Now you speak of these contract interpretations that you have used. How much less than 7½ million acre-feet of water do you think will be available in the upper basin States if these corrected interpretations come in?

Mr. HOWARD. There, again, I would defer to our engineers. The figures that they have given me indicate that shifting from the per annum method of measurement to the average method of measurement represents a difference to us, or, rather, an average use in the upper basin of 6,200,000 acre-feet rather than the 7½ million computed on the average basis.

Senator ANDERSON. You used that figure. I wanted to ask you at the time: is that regulated flow?

Mr. HOWARD. That is regulated flow, yes. That amount of water could not possibly be used without regulation.

Senator ANDERSON. Does that assume the construction of all these storage dams?

Mr. HOWARD. I don't think it necessarily assumes the construction of all of them. It assumes the construction of enough storage to regulate the flow of the river.

I think some of these dams exceed any requirements for storage, but are put in for power.

Senator ANDERSON. I mean of all the dams that are necessary for regulation.

Mr. HOWARD. Such dams as are necessary to regulate the flow of the river and to increase the storage.

Senator ANDERSON. If this will bring the consumptive use up to what you think, there will be 3 million——

Mr. HOWARD. Three million. If you stop there we would not be too worried.

Senator ANDERSON. That is how far the bill goes?

Mr. HOWARD. The bill purports to commit the Congress to further works which would consume vastly more water. The whole thing is predicated upon compact interpretation that we have to straighten out before we can acquiesce in anything.

Senator ANDERSON. It is anticipated it will take until about 1968 to build just the projects required under this bill.

Do you not imagine the Supreme Court will get to the Arizona-California case by that time?

Mr. HOWARD. I expect so.

Senator ANDERSON. We are trying to say there ought to be a possibility of some development in these upper-basin States. Maybe I at least am wrong in interpreting what your testimony would lead to, but it seems to me that the burden of your testimony is, let us do absolutely nothing in the upper-basin States until we can establish beneficial use for all the water in the river.

Then we will have priority of use and it will not matter what the compact is, we will have it all.

Mr. HOWARD. We recognize the validity of the Colorado River compact and so far as California is concerned we intend to adhere to it. But we do not intend to adhere to some other compact forced upon us by an erroneous interpretation we didn't know about at the time we undertook our commitments.

Senator ANDERSON. But the beneficial use item, as I recall your testimony, you said that would add maybe 300,000 extra acre-feet. If it did add 300,000 acre-feet to the present use, it is well below your 6,200,000 acre-feet mark.

Mr. HOWARD. It does go to the question of computation of the availability of water. If those computations cannot be relied upon, then this whole structure falls. It may be there is a margin in there. I imagine that the use in the upper basin could be substantially increased and be within the compact under any set of interpretations.

This is a sort of all-or-none deal, and we feel that it is our duty to call the attention of the Senate to the fact that the proponents of the bill are proceeding on what we conceive to be erroneous interpretation of the Colorado River compact, and we do not want those interpretations to be in any way crystalized or imbedded or depended upon as a basis of this legislation.

Senator ANDERSON. Do you recall the historical situation in which the Boulder Canyon Act was adopted?

Mr. HOWARD. I have read the record of it.

Senator ANDERSON. Was California not desperately in need of some water down there?

Mr. HOWARD. Yes; and we fought 10 years or more in the Congress to get a bill through.

Senator ANDERSON. I think if the upper basin States would have known what the subsequent 30 years would have been developing, you might have still been fighting for it because they really believed this was a compact and no longer would the law of the jungle obtain and we would finally get a compact under which we could operate.

Mr. HOWARD. Is the Senator referring to the doctrine of appropriations as the law of the jungle?

Senator ANDERSON. I am referring to the fact that steadily whenever there is an attempt to develop water in upper-basin States California says, "That jeopardizes our water supply. We can't have any development in the upper-basin States."

Therefore, you try to force the upper-basin States, my own State, in taking the position that maybe we will have to give all the water to the Indians in order to get ahead of the compact, which I think is wrong.

Our State has been able to work out its problems with the Indians. It would seem to me that it would be desirable if the States in the Colorado River basin could try to work out their problems instead of one State saying there shall be no development; we have what we want now; there will be nothing else anywhere.

Mr. HOWARD. May I say it is not my memory that California has resisted all developments in the upper basin. We have them tabulated somewhere, I can't recall the exact number.

Senator ANDERSON. You did permit the transmountain diversion of the Big Thompson project. We had showed the other day that out of a good many hundred thousand acre-feet of water, my State, I think

had 10,000 acre-feet, or something of that nature, that we were permitted to have, and we appreciate that generosity.

But still we believe we could have a little more without it hurting California.

Mr. HOWARD. If you will proceed upon the compact interpretation that we rely on, I think there will be water for California and room for additional development in the States in the upper basin.

Senator ANDERSON. Section 8:

> Nothing contained in this act shall be construed to alter, amend, repeal, construe, interpret, modify, or be in conflict with any provision of the Boulder Canyon Project—

and so forth.

It would interest you to know how that language got in there.

Mr. HOWARD. I was not present at the time, but I was told it was told it was put in on the House side last year and carried over here.

But we appreciate the generosity of the authors of this bill in carrying it over into this Senate bill. It was brought into last year's bill by amendment, I think on the House side, although I am not too sure of that.

Senator ANDERSON. I think some extra effort was put in to add a few additional words that might give some satisfaction, we hoped, at least.

Mr. HOWARD. It was one of the amendments we sought. I did not attend last year's hearings, but I am quite sure that Senator Kuchel was instrumental in seeing to it that the language was carried over in the Senate version.

Senator ANDERSON. Assuming that the United States did assume all the unappropriated water in this version, would not the enactment of this legislation set aside enough water for the uses of those projects?

Mr. HOWARD. I did not quite understand the question, sir.

Senator ANDERSON. There have been arguments about the Federal ownership of this water. If you did assume that the Federal Government did own all the unappropriated waters, would not the enactment of this legislation set aside enough water for the use of these projects?

Mr. HOWARD. It had not occurred to me that the question of Federal ownership would have much to do with quantities of water available for use.

Senator ANDERSON. Let counsel for the Bureau of Reclamation—we have been discussing this point—I would rather he would deal with this point.

Mr. BENNETT. In the minority report on S. 1555, last year the question was raised with respect to the purported claims of the United States in the pending litigation for end use of water for Forest Service purposes, Bureau of Reclamation, and so forth. The fear was expressed that the United States there was claiming Federal ownership of all the water.

Now, if you assumed that is what the United States was doing there, would the water supply for this project seem assured to you under this bill?

Mr. HOWARD. Would that have the effect, sir, of putting the water claimed by the United States for other purposes in the same category as the Indian claims, that is superior to and outside of the compact? Is that the point?

Mr. BENNETT. No, the point is what effect would such a claim, if it were made, have on the water supply for this specific project.

Senator KUCHEL. You are speaking about minority report last year?

Mr. BENNETT. That is right. Senator Kuchel knows the point I am trying to get at.

The committee is dealing with a bill which has been introduced to authorize certain projects and question has been raised concerning the availability of water supply for the project in the minority report.

One of the arguments made was that the United States in the pending litigation is claiming ownership of unappropriated water so far as Bureau of Land Management purchases, National Forest Service purchases, and those things are concerned.

The specific question here is who this bill in and of itself, if we accepted that interpretation, which I am sure the members of this committee do not accept with respect to ownership of unappropriated waters, there still would be no question of water supply for this project, would there, sir?

Mr. HOWARD. It is not clear to me that there would be. It is a question that is new to me. I had not analyzed it in that way.

If the Federal water is outside the scope of the compact and comes ahead of it, then we would have an additional problem similar to the one I tried to outline with respect to the Indians.

If I have read the law correctly, there is no such thing as ownership of running water.

All the rights in it are usufructuary only and since the institutes of Justinian there is no property interest in running water. It is here today and gone tomorrow. It is not the subject of ownership. All rights are usufructuary, but it is also an established rule in the West that anyone who lawfully captures water and impounds it in a reservoir, stores it or diverts it in his own works, becomes the owner of the corpus of the water so that is what the United States would have except when acting under the reclamation law. When the United States goes into the various States for the purpose of developing water for reclamation, it goes in as a private proprietor, as any citizen goes in to acquire the water right.

However, that was not done in the case of the Boulder Canyon Project Act.

The United States made no appropriation, merely went in on the theory of navigation and took control of the water and undertook under congressional authority a contract with reference to its use.

Now, I assume that if the United States goes in and captures water in any of the upper basin States there must be some arrangement made for the disposition of that water either under State law or by some arrangement similar to the Boulder Canyon Project Act.

Senator KUCHEL. I do know, Mr. Chairman, that Mr. Bennett and the Department of the Interior take the same view on the question which was raised by the Department of Justice on unappropriated waters running to the United States.

The Department of Justice has made that contention. It has made it in a number of instances in litigation, some of which is, and has been, of concern to the West.

But I raised it in my minority report last year because it was a question which again indicated that in the absence of any determina-

tion of that point by a competent tribunal, here was the Government of the United States through the Department of Justice taking the position which I am sure you believe is wrong and which the Department of the Interior believes is wrong.

Senator ANDERSON. You have some additional questions, Senator Kuchel?

Senator KUCHEL. No.

Senator ANDERSON. Senator Goldwater?

Senator GOLDWATER. I have just 1 or 2 questions.

I think in all fairness to my own State I should recognize, Mr. Howard, that this is a very fair and fine presentation of California's position in the Arizona-California suit. I do not believe that this is the place to try that suit and I am not going to refer to any of your remarks about Indians and about the Gila River and III–b water.

I will leave that up to the court and I hope that in the future that witnesses from California will refrain from the temptation of trying our suit within the confines of this chamber.

Senator KUCHEL. Now, Senator, you and I are good friends. I have sat here and listened to all sorts of testimony. Even the other day, as you know, it was contended in roundabout way that civil defense was going to be slaughtered if this legislation was not passed.

Let us at least have the right to say here what we believe ought to be said.

Senator GOLDWATER. I do not find civil defense any place within the confines of our suit.

Senator KUCHEL. It is within the confines of this record that is being made.

Senator GOLDWATER. I remark this because it is now before the Supreme Court of the United States. I do not think it should be tried before this body. And I do not intend to do it.

Senator ANDERSON. Let me say to the Senator from Arizona that he probably could not try it before a more favorable jury.

Senator GOLDWATER. I agree with you. I was going to make that observation, but I did not want to cast any doubt as to the honesty and sincerity of the Supreme Court.

Senator KUCHEL. I very much hope that the chairman was speaking in jest, because when I am sure when we come to sift legal rights that the chairman will indicate his usual fairness which I know the Senator from Arizona would.

Senator ANDERSON. With a small degree of prejudice.

Senator GOLDWATER. How much has been paid back on the $220 million of bonds by the metropolitan water district?

Mr. HOWARD. I would have to get those figures from the Comptroller, but the bonds were issued over a period beginning about 1932. We are selling some more of them next Tuesday, that same issue. They were 50-year bonds with early maturities deferred 15 years.

If it is important, I can get for the record just the amount we have paid. We paid interest on those bonds from the beginning and have retired those that fell due serially.

But just the exact amount, I couldn't give you.

Senator ANDERSON. It will be supplied by Mr. Howard and put in the record at this point.

(This information was read into the record March 5, 1955, during the testimony of Mr. Brower.)

Senator GOLDWATER. Under the Boulder Canyon Act and subsequent documents, it is my recollection that the Metropolitan Water District was allocated 550,000 acre-feet a year. Am I correct in that?

Mr. HOWARD. The situation is that that figure is out of this priority agreement which was negotiated in the early stages before our water-delivery contracts were made. The priorities were set up so that the agricultural interests have priorities aggregating 3,850,000 acre-feet a year, then follows a fourth priority to the Metropolitan Water District of 550,000 acre-feet per year.

And a fifth priority in which the city of San Diego, now merged with the Metropolitan Water District, participated with another 550,000 acre-feet, plus 112,000 acre-feet for San Diego.

You will note that the 3,850,000 plus the fourth priority add up to 4,400,000 acre-feet per annum.

The rest of that, the rest of the contract water is excess or surplus, which includes III-b water.

Senator GOLDWATER. But the anticipated or planned capacity diversion of the Parker Metropolitan project is 550,000 acre-feet.

Mr. HOWARD. No, our capacity is roughly 1,600 second-feet, which, if operated fully, would divert 1,212,000 acre-feet a year, which we conceive to be our contract right.

Senator GOLDWATER. Your population according to your testimony, is now 6 million. What is the largest amount of water that has been used in any one year under these priorities in the Metropolitan system?

Mr. HOWARD. You understand this is a supplementary supply. I take it that your question goes to the amount diverted from the Colorado River.

Senator GOLDWATER. That is right.

Mr. HOWARD. That is approximately 300,000 acre-feet.

Senator GOLDWATER. Then you can support at the present time 6 million people with approximately 300,000, you said?

Mr. HOWARD. It is a very complicated problem, Senator, because we are overdrawing our ground-water supplies to a great extent and supporting quite a large element of our population on overdrawn ground water.

We on the coastal area are now threatened in many places, in some instances with the possibility, and in some instances the actuality, of salt-water intrusion.

But the water-producing plants, pumping ground water, are privately owned, owned by citizens. They find it cheaper to overpump than to import water.

It is a rather difficult question to state just what population can be supported by given quantities of imported water.

We can't do it permanently on the basis we are doing it now.

Senator GOLDWATER. But you support 6 million people today, and you have not yet approached the agreed use of water out of the Colorado for these domestic purposes.

If my memory serves me correctly, you anticipate a population in the area that you serve of some 9 million by 1965, which is a third more than you now serve.

So even at 1965 it appears to me that the present availability of water which we recognize, that portion of it only, will serve, and that the Metropolitan Water District is in no danger of ever having to default on its bonds nor will the 9 million people of California, and I

nope you have that population in 1965, not be endangered by not having sufficient water at that time.

Mr. HOWARD. The water supply to the metropolitan area is made up of local water, that is, water taken from the ground, and the little mountain streams which became inadequate many, many years ago.

The city of Los Angeles, I think in the year 1913, by a project that was initiated somewhat earlier than that, brought in water from the Owens Valley, later expanded to include the Mono diversion. They no sooner let the cement harden on that project then they began to look for additional water supplies.

These projects take a long time to develop. You cannot use to the limit on domestic water and then provide a new supply.

New supplies have to be provided well in advance of the need and our California water agencies have been very far-sighted and have provided for water ahead of its need.

We propose to continue to follow that practice.

Senator GOLDWATER. The point I wanted to bring out, and I have constantly felt that your own figures have substantiated this point, not only the figures you supplied us today, but the figures that we have listened to for years and years bring out the point that southern California is in no danger from the lack of domestic water; that they can have under recognized rights in the Colorado, depending only upon that source.

If we forget other sources, the rights that we recognize you have in the river will protect the domestic water supply of southern California or the Metropolitan Water District.

Mr. HOWARD. Of course, we are dealing in the long-time future, rather than with the present.

Senator GOLDWATER. I suggest that is what we are all trying to do. That is what Arizona is trying to do, and that is what the upper basin is trying to do.

The only thing we do not want to do in the process of thinking of the long-time future is to confine our thinking to one State.

Mr. HOWARD. And we don't want such an overdevelopment of the river that an economy once established will be destroyed.

Senator GOLDWATER. I have never seen any evidence that that can occur.

Even the most vociferous arguments I have ever heard from California have not been backed up with sufficient figures to convince me that such a thing could happen if California is willing to recognize that in spite of the fact she puts no water in the river, other States are willing to cooperate with her to the exent that she has that water.

Mr. HOWARD. Is that a question?

Senator GOLDWATER. No, that is merely a statement, and I am all through. I could go on forever because this is a delightful subject and one which I will have the opportunity of bringing up when the central Arizona project comes before us once again.

Senator ANDERSON. Thank you very much.

Mr. HOWARD. Thank you, Mr. Chairman, for the opportunity of being here.

Senator KUCHEL. Mr. Chairman, the next witness from our State is a distinguished California engineer of standing and repute, presently a member of the Colorado River Board of California and pres-

ently the general manager and chief engineer of the department of water and power for the city of Los Angeles.

I am happy to introduce to the chairman and the members of the committee Mr. Samuel B. Morris, of Los Angeles.

Senator ANDERSON. May I say, Mr. Morris, that some of us who have taken a position they feel is favorable to public power, are happy to see you here because you have had a great deal of credit for the position others have taken.

STATEMENT OF SAMUEL B. MORRIS, MEMBER, COLORADO RIVER BOARD; GENERAL MANAGER AND CHIEF ENGINEER, DEPARTMENT OF WATER AND POWER, LOS ANGELES, CALIF.

Mr. MORRIS. I will be pleased in my comment to mention that particular aspect of this bill.

I have a prepared statement which I presume copies of have been distributed to members of your committee. My name is Samuel B. Morris. I am general manager and chief engineer of the Colorado River Board of California. The department of water and power furnishes water and electricity to all of the 2,150,000 residents of the city of Los Angeles. The department has contracts with the Secretary of the Interior for nearly 18 percent of the firm power production at Hoover Dam and is one of the agencies which guaranteed to purchase and pay for power if not used by the States of Nevada, Arizona, and certain other users. Prior to withdrawal of Hoover power by the States of Arizona and Nevada, the department used as much as 50 percent of the output of Hoover Dam.

The department, as agent for the United States, generates power for the States of Arizona and Nevada, the Metropolitan Water District of Southern California and the cities of Pasadena, Glendale, and Burbank as well as Los Angeles. Accordingly the Los Angeles Department of Water and Power is vitally interested in maintenance of its 50-year contract for purchase of power which continues until the year 1987.

In July of 1954 I had the privilege of filing a statement with the Senate Committee on Interior and Insular Affairs on S. 1555 which appears in the published transcript of those hearings, so I will not repeat the testimony which is available to your committee. I do wish, however, to refer to this prior presentation, which called attention to the departure from existing reclamation law by substantial use of the "one basin account," the planned repayment under the Collbran formula, and extending these payments for 100 years or longer. I pointed out that the existing general reclamation law provides for irrigation repayments in substantially equal installments in a 40-year period after a 10-year development period.

Under the Collbran formula the irrigators, within the limit they can pay off 10 to 25 percent of the cost allocated to irrigation, would make these payments over a 50-year period following a 10-year development period. However, repayment of the 75 to 90 percent of the cost to be returned from power revenues would not even be commenced until after a 40- or 50-year period required to return the power investment with interest. Consequently, the interest charges borne by the general taxpayer are vastly greater under the Collbran formula than under the general reclamation law.

I cited the single example of the Shiprock division of the Navaho project. The total construction cost of that project was estimated to be $178,825,000 with a construction and development period extending from 1958 to 1985 according to a tabulation included with testimony by the Commissioner of Reclamation at the hearings before the House Committee on Interior and Insular Affairs. Of this cost $13,300,000 was to be repaid by the irrigators without interest during the period 1970–2035.

The balance, $165,500,000 was not to be repaid until the period 2020–2035. Assuming an interest rate of 2½ percent per annum, compounded semiannually on the funds advanced by the taxpayers for construction of these works—I might say the 2½ percent is the approximate rate of longtime obligations of the United States—less repayments as made by irrigation and power, would result in costs accumulated to the year 2035 in the total amount of $782,393,000. This cost to the taxpayers is more than four times the total construction cost. Anyone who borrows money is familiar with the piling up of interest costs where repayment of capital is long delayed.

I might say on the project then proposed that the cost without interest was about $1,630 per acre and the cost with interest is about $7,200 an acre.

Under the project now submitted, I understand that the estimated allocation for irrigation is $210 million, approximately for an irrigated area of 137,250 acres, or a cost of about $1,530 without interest an acre, of which the irrigators expect to repay about $225 per acre.

It is commonly stated that such a reclamation project as the Shiprock division is a "fully self-liquidating project." By such expression, the tremendous subsidy by the general taxpayer is hidden and nowhere revealed. Another sin of concealed subsidy and lack of proper accounting is that different figures are used by opponents and proponents of such a project. Proper accounting would so define the cost of a project including interest cost and spell out the funds to be returned to the United States and the amount of subsidy involved so that opponents and proponents would use the same figures.

In order to give a greater understanding of the interest costs on Federal water projects under the several existing Federal practices, I have made studies and have reduced these studies to a table and charts indicating the cost to the taxpayer of five separate policies of the Government involved in the current general policies of authorization. In preparing these studies I have made certain assumptions in order that each of the five studies might be directly comparable. The five projects analyzed are: (1) power, (2) irrigation under reclamation law, (3) irrigation under use of the interest component of power revenue to repay irrigation costs in excess of the ability of the irrigators to repay, (4) irrigation under the Collbran formula, and (5) nonreimbursable projects such as flood control and navigation.

Criteria used in preparing table and charts: For the purpose of these studies I have assumed a million dollar project under each of the five studies. I have also assumed that the project would be constructed under a 10-year period with equal annual expenditures of $100,000 each year.

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I might interpose the reason I have assumed that long construction period is that this same million dollar project might, by use of a multiplying factor, approach a major project such as proposed in S. 500.

Interest is compounded annually on these construction costs until the project is constructed and placed in service, making the total investment $1,148,346. In the case of irrigation projects interest is compounded during the ensuing 10-year development period, bringing the total investment to $1,469,980.

1. Power projects: Power users repay capital with 2½ percent interest in 50 years after completion of a 10-year construction period.

2. Irrigation projects: Under reclamation law the original $1 million cost will be repaid in 40 equal annual installments without interest, after a 10-year development period.

3. Under "use of the interest component" the taxpayer will repay 80 percent of the irrigation cost by diversion of the interest component paid on power capital, the irrigator being able to repay in equal annual installments a total of only $200,000 or 20 percent of the $1 million cost without interest in 40 years, after the end of a 10-year construction period plus a 10-year development period. Assumption in this study that the irrigators can only repay 20 percent of the irrigation cost may seem low; however, reports on the Colorado River storage project indicate the irrigators in the average will pay little more than half this percentage.

4. Under the "Collbran formula" the irrigators will repay in equal annual payments 20 percent of the $1 million cost without interest in 40 years. They will continue repayments at the same rate for 16 additional years making a total repayment of $280,000 or 28 percent of the $1 million cost. During this latter 16-year period revenues from power are used to repay without interest the 72 percent of the cost the irrigators are unable to repay in 56 years following the end of the 10-year development period. This is based upon power revenues first having repaid the power costs with interest in 50 years following a 10-year construction period, after which time power revenues are available in sufficient amounts to provide for such repayments of irrigation capital.

Following page 13, I have a table giving summary of these costs and a series of charts which will make clear how the cost of interest payments go up on these projects.

Senator WATKINS. Have you ever attempted to figure out what the benefits would run to if you allowed the same rate of interest on those, the benefits that come to the country, growing out of this construction?

Mr. MORRIS. The benefits are annual benefits accruing each year. They are not a part of this analysis. They are not a cumulative benefit for the 30- or 40-year period.

Senator WATKINS. The benefits will go on as long as the project will last, will they not?

Mr. MORRIS. If you were a borrower of a million dollars from the bank——

Senator WATKINS. That is a different story than what you are talking about.

The lender in this case gets the direct and indirect benefits back again.

It seems to me you should use the same sort of formula to accumulate those and if you do and you find out that the benefits will be more in the end than the compound interest you charge the other way.

Mr. MORRIS. The proportion of the benefits which the irrigator is able to pay is a small portion of the total benefits.

Senator WATKINS. I want you to know that in this project the people that are going to be paying for power are the same kind of people that are going to pay for irrigation costs. It is all one. It is going to be repaid by the same people in the same States. They buy power.

It is a community effort. It is a cooperative effort on behalf of these four States. They will pay all of that.

Mr. MORRIS. I will presently discuss that.

Senator WATKINS. The people who are going to buy the power, we expect to pay the whole cost in the area, et cetera. There will be interest on everything except that part of it allocated to irrigation.

Mr. MORRIS. I will discuss that as we go along. It is true that the power rates are set to repay the cost of power in 50 years, with interest.

Senator WATKINS. The present plan in S. 500 is not the Colorado plan. It will permit the starting of the payment on irrigation a lot sooner.

As a matter of fact, it starts soon after the irrigation projects are finished.

You do not have to allocate all the income, for instance, from power to the power units. That can be extended over a long period of time and pay the interest on it.

The revenue that is coming out of the power that is supplied to irrigation can start sooner. It does not have to work the way you are pointing out.

Mr. MORRIS. That is the way it worked under S. 1555.

Seantor WATKINS. You mean the one that was introduced and not the one that was finally reported out. Which one do you use, the one reported out, or the one introduced?

Mr. MORRIS. I used the figures presented by the Commissioner of Reclamation in connection with the bill a year ago.

Senator WATKINS. I would like to ask you also another question on this matter of interest.

Have you ever computed the interest on the flood-control money that has been appropriated for the Los Angeles area over the years and figured it out on a permanent basis, not only for 50 years, but for 500 years?

Mr. MORRIS. I have not for 500 years, but I have in these studies that I am presenting for 50 years.

Senator WATKINS. Just on the flood-control money?

Mr. MORRIS. That is on the typical million-dollar project so that you can follow through on these which I have accompanying my paper.

Senator WATKINS. When I am talking about flood control, it is not in connection with irrigation, but flood control directly.

Mr. MORRIS. That is what I have here. A nonreimbursable flood-control project.

Senator WATKINS. Have you brought it up to date in the present-day money?

Mr. MORRIS. In this study, dollars are taken as dollars.

Senator WATKINS. Not the present value?

In other words, what money was spent years and years ago had a great deal more purchasing power than it has today, as we all know. So if we are going to compare it with our present-day programs, you ought to put it in the same kind of money.

Mr. MORRIS. These examples I have here are just million-dollar expenditures, so-called, or capital, showing what the interest costs are.

Devaluate those to 50 percent, or you can make the dollars worth 200 percent. They would still have the same relative effect.

Senator WATKINS. In other words, you apply the same figure, you multiply, compound the interest at 2½ percent, not for 50 years——

Mr. MORRIS. In these studies and charts you have dollars. If you want to convert them to pounds sterling, you multiply it by a factor.

Senator WATKINS. I understand that. But what I am trying to find out is, in your study have you ever taken the money spent by the United States for flood control for which there is no reimbursement to the United States?

Mr. MORRIS. I have taken a million-dollar project and have computed its cost the same as the rest so as to make five comparable projects. You can see how they relate one to the other.

Senator O'MAHONEY. All right, Mr. Morris.

Mr. MORRIS. If you will turn to the series at the back of the text, charts 1, 2, 3, 4, 5, the first one is power. You will note under this power chart 1, power project, that the power user repays the total cost of the project with interest in 50 years, amounting to $1,980,414, so that the taxpayer is not out any money in connection with the power project.

2. The irrigation project under reclamation law, you will note on chart 2, under reclamation law the irrigator at the end of 40 years following the 10-year development period will return the $1 million cost without interest.

The interest charges, however, borne by the general taxpayer, will have accumulated to $2,261,925.

I follow through on the same basis with these other comparisons.

3. Irrigation project under diversion of the interest component on power revenues: Going into the irrigation project under division of interest component of power revenues, under which a number of projects have heretofore been analyzed and programs presented for their repayment under such a basis.

In this study it is assumed the irrigator can only repay $200,000 by the end of the 40th year while diversion of the interest component from power revenues repays $800,000, making complete return of the $1 million irrigation cost, without interest.

It should be pointed out, however, that the interest on power revenue is a cost to the taxpayer, as this sum is due as hire for the money. Accordingly, the cost to the general taxpayer at the end of the 40-year period is $3,061,925.

Then I go to Collbran formula.

Senator O'MAHONEY. Before you go to that, Mr. Morris, I would like to ask first how long have you been with the Colorado River Board of California?

Mr. MORRIS. How long have I been on it?

Senator O'MAHONEY. Yes.

Mr. MORRIS. I don't know exactly. I would say in the order of 5 or 6 years.

Senator O'MAHONEY. How long have you been chief engineer of the Los Angeles Department of Water?

Mr. MORRIS. About 10½ years.

Senator O'MAHONEY. How long have you been with that organization?

Mr. MORRIS. The same time.

Senator O'MAHONEY. Are you familiar with the Parker-Davis Dam?

Mr. MORRIS. In a general way; yes.

Senator O'MAHONEY. California pays for that; does it not?

Mr. MORRIS. Yes.

Senator O'MAHONEY. Part of it, I mean.

Mr. MORRIS. The Parker Dam was built by funds of the Metropolitan Water District of southern California and constructed by the Bureau of Reclamation.

I believe there was a small amount of Public Works Administration money which went into it, but rather a small amount.

The Metropolitan Water District secures half the power. The State of Arizona the other half of the power from that Parker Dam.

Senator O'MAHONEY. How about the Davis Dam?

Mr. MORRIS. The Davis Dam, built by the Bureau of Reclamation and the power from it, I believe it is 225,000 kilowatts, is allocated 50 percent to Arizona and I believe 25 percent to Nevada, and 25 percent to California agencies in which we do not participate.

I believe the Imperial irrigation district gets some of that power and some Federal installations in California.

I might add to that we as the largest public power agency in southern California were disappointed we were unable to secure any of that power to assist us, in view of the decreasing power available to us from Hoover on account of the withdrawals of power by the States of Arizona and Nevada.

Senator O'MAHONEY. How about the interest component in connection with the Davis Dam?

Mr. MORRIS. I do not have the effect on Davis. On Hoover and Parker I do.

Senator O'MAHONEY. I want to discuss Davis for the moment. Is it not a fact that the interest component used on the Davis Dam and that California to the extent that it participates, gets the benefit of that interest component?

Mr. MORRIS. No, California gets no benefit from the interest component on the Davis Dam.

Senator O'MAHONEY. Did you not just say that California gets about 25 percent?

Mr. MORRIS. 25 percent of the power of Davis Dam.

Senator O'MAHONEY. Yes.

Mr. MORRIS. I believe that is correct.

Senator O'MAHONEY. Is not the repayment of the Davis Dam figured on the interest component formula?

Mr. MORRIS. That is not the way it works. The interest from power revenues is used to pay the capital cost of irrigation works the irrigator is unable to repay. There is no irrigation associated with Davis Dam.

The power charges are fixed on a basis so that power repays in 50 years its proper allocation of power.

So to the extent that power revenues are paying for all or a portion of the Davis Dam, that payment, with interest, is being made for the dam and powerplant.

It is the diversion of the interest component to pay for irrigation projects upon which I am commenting here, and California secures from Davis Dam no interest component money to pay for any irrigation in California.

Senator O'MAHONEY. Does it not secure a benefit by reason of the application of the interest component to the cost of the Davis Dam?

Mr. MORRIS. No; that is the proper application. You are returning money with interest for power, and the extent that any power goes to California, it is retiring the cost with interest in 50 years of that allocation. That is not a special benefit.

Senator O'MAHONEY. That is a proper allocation of the interest component?

Mr. MORRIS. Absolutely.

Senator O'MAHONEY. There is no question about that at all?

Mr. MORRIS. That is right.

Senator O'MAHONEY. So that where California gets the benefit you find that the formula is correct?

Mr. MORRIS. I find the payment of interest is correct where it is applied to power only.

Senator O'MAHONEY. Of course, that is a power dam.

Mr. MORRIS. And providing it goes back to the general funds of the Federal Government?

Senator O'MAHONEY. Have you taken into consideration in the preparation of your paper the provisions of the bill before us, S. 500, on page 8 and page 9, beginning with the section (d), line 21, which reads:

> Revenues in the basin fund in excess of operating needs shall be paid annually to the general fund of the Treasury—

and then in succeeding paragraphs the limitation is fixed at 50 years, in subparagraph 1, subparagraph 2, subparagraph 3, an exception being made in subparagraph 4 in the case of Indian lands.

Have you taken that language into consideration?

Mr. MORRIS. As I interpret that language of S. 500 it provides that the costs allocated to power are returned with interest in 50 years; that the costs of irrigation projects are returned within 50 years plus a 10-year development period, without interest.

That would enable the revenues from power to be applicable to irrigation projects for 10 years longer than the period in which the power costs have to be returned with interest.

Senator O'MAHONEY. Here is an instance in which power revenues are required to go back into the general fund of the Treasury.

Now, is it your position that the Congress should not in any event extend to the future settlers upon feasible irrigation projects the benefit of the revenues derived from power? Should we neglect to build such projects altogether?

Mr. MORRIS. No. But there are some extraordinarily expensive projects involved in which the irrigator can only repay a small percentage of the cost and——

Senator O'MAHONEY. Do you believe that the irrigator in this area of the upper basin should not be permitted to pay a small percentage of the cost when there are power revenues? Is it your position that the irrigator should pay the total cost of putting the water on his land?

Mr. MORRIS. I should say that the reclamation law which provides that he shall make these payments in 40 years after a 10-year development period without interest is a fair proposition and that is what is being observed in the Imperial Valley and Coachella Valley in California in the return of irrigation cost.

Senator O'MAHONEY. Is it your position that no concession should be granted by law, by Congress, beyond that which has been granted to the irrigators in Imperial Valley? Does that mark the zenith of congressional generosity in the building of big reclamation projects?

Mr. MORRIS. I believe the Government should establish rules of general applicability of which the reclamation law as its exists is one and, if that should be modified, I believe it should be proper to consider its modification in a general way.

Senator O'MAHONEY. Is that what is being done here?

Mr. MORRIS. That is being investigated by the Hoover Commission, I understand, and by the Cabinet committee.

Senator O'MAHONEY. Is that not substantially what this bill attempts to do with respect to the development of the upper basin?

Mr. MORRIS. This bill attempts to put the irrigation in the upper basin in a different class from the general applicability of irrigation law.

Senator O'MAHONEY. If we assume that the development of the waterpower in the upper basin will be such as to develop revenues from power which, together with the repayments that are made, will accomplish the development of these agricultural properties at a more generous rate than that which was applied in Imperial Valley, do you advise this committee not to permit such a thing to happen?

Mr. MORRIS. I analyze that specifically in my paper further on.

Senator O'MAHONEY. You can answer the question yes or no.

Mr. MORRIS. I say "No" to that question, as I understand your question.

Senator O'MAHONEY. You mean to say that Congress, in your judgment, would be free to pursue a more generous policy to the more difficult agricultural project in the upper basin than was applied in the Imperial Valley?

Mr. MORRIS. I am afraid, Senator, in connection with our discussion, I did not accurately recall your question when I said "No" because I would have replied the opposite if I had the impression you were asking whether there should be a departure from reclamation law here.

It is my belief that the general reclamation law should be amended for general applicability.

Senator O'MAHONEY. And should not be varied for any area whatever?

Mr. MORRIS. I believe that is substantially correct.

Senator O'MAHONEY. Can you tell the committee whether or not the Imperial Valley irrigators pay any part of the cost of the Hoover Dam?

Mr. MORRIS. The Imperial irrigation district was a diverter of the water to Imperial Valley long before the Hoover Dam was built.

They are paying their costs, as I understand it: they have the president of the Imperial irrigation district here.

It is my understanding they are returning in full the cost of the All-American Canal and the irrigation works.

The Imperial Valley having a prior right on the river is not paying a portion of the cost of the Hoover Dam itself.

Senator O'MAHONEY. The Imperial Valley and its population have, however, benefited very greatly from the structures which have been authorized and built by Congress, including the All-American Canal and the Hoover Dam?

Mr. MORRIS. And they receive no payments to meet irrigation costs from Hoover Dam. They do receive the benefits of some regulation from Hoover Dam.

We in California return the total cost of the Hoover Dam with interest, in 50 years.

Senator O'MAHONEY. Does not your argument boil down to this: that unless the formula of the original reclamation law is applied, in your opinion, and those whom you represent, would prevent any agricultural development in the upper Colorado River basin?

Mr. MORRIS. As I discuss here later, my position is that with as wide a departure from reclamation law as embodied in this bill and in view of the pendency of the Hoover Commission report, and the reports expected from the Cabinet Water Policy Committee, I do not believe it is wise for Congress to adopt a billion and a half dollar project, open-ended to further participating projects in the future, under such a large change in reclamation policy as provided here, pending receipt of those reports.

Senator O'MAHONEY. I understood you before to say you would not advocate any change at all.

Now, am I to understand that yould advocate a change?

Mr. MORRIS. I am not advocating a change, Mr. Senator.

Senator O'MAHONEY. I realize you are not. I use that word because of what you just said. Your testimony was, having originally testified in response to my question that you believed that the rule which should be followed is the rule of the original reclamation law. Then later on you said, speaking about the Hoover Commission report which may come, that you do not believe that as great a variation from the original reclamation law as provided in this bill should be allowed, therefore, was trying to find out what sort of variation you would, in your own way, allow.

I am trying to determine what degree of generosity the general manager of your organization is willing to concede.

Mr. MORRIS. I might say, Mr. Senator, that this was brought up during the time you were not present at this meeting, while Mr. Howard was speaking. You should realize that California did not enter objection to the several developments to the upper Colorado River, including the Big Thompson project, until these major bills, the Colorado storage and participating project, and the Frying Pan-Arkansas project, proposed last year.

That was the first time we entered objections to project bills in the upper basin. We let the other bills pass through without objection.

Senator O'MAHONEY. When the reclamation law was passed back in 1902, the repayment of irrigation projects, as I recall, was made in 10 years.

I am rather of the opinion that Imperial Valley was developed during that time. Do you think that the 10-year repayment plan should have been applied to the Imperial Valley?

Mr. MORRIS. The reclamation law was amended from the 10-year period to 20 to 30 to 40 plus 10 successfully, and those are amendments to the general law of general applicability of which I speak, and which I favor, rather than a major departure from reclamation law by such broad new provisions in a specific project.

Senator O'MAHONEY. It is clear that now you have come to the end of your ribbon of generosity.

Mr. MORRIS. Owing to the general policy set up in this bill and its foundation upon interpretation of the law of the river in which we differ, which Mr. Howard testified to just prior to me, we are opposed to this bill.

Senator O'MAHONEY. And if your way should be adopted by the Congress, would not that result in diverting to the lower basin the waters which under the Colorado River compact of 1922 were agreed upon by the States and by Congress to be used in the upper basin States for beneficial use? Do you not agree that if this bill or something like it is not passed these irrigation projects cannot be built?

Mr. MORRIS. I would like to see what the Hoover Commission report is going to state.

Senator O'MAHONEY. Of course I have been trying to get your views, without waiting for the Hoover Commission.

Mr. MORRIS. My views, in a way, were expressed in the President's Water Resources Policy Commission Report, upon which I served.

Senator KUCHEL. Mr. Chairman, I would like to identify the witness for you a little bit in greater detail.

He was the dean of engineering at Stanford University. He was a member of President Truman's Water Resources Policy Commission.

Senator O'MAHONEY. I am aware of that.

Senator KUCHEL. He is past president of the American Society of Civil Engineers.

Mr. MORRIS. That is just local sections. I am a past president of the American Waterworks Association and the American Public Power Association.

Shall I proceed? I was just describing these charts which I have prepared. I had just described the nonreimbursable project and was proceeding to the Collbran formula project.

4. Irrigation under the Collbran formula: When I prepared this chart I prepared it in the way in which I have described here.

This study involves the use of the Collbran formula in which the irrigators repay $200,000 at the end of the 40th year and $280,000 by the end of the 56th year after a 10-year development period. The balance of the cost without interest of $720,000 is paid from power revenue after the power capital has been returned with interest in 50 years.

This concentration of repayment in the delayed 16-year period greatly increases the interest charges to the general taxpayer and, you will note, these costs to the taxpayer under the Collbran formula amount to $4,390,026.

5. Nonreimbursable projects: This study shows the nonreimbursable projects such as flood control or navigation with compound interest accumulated for 50 years after completion of the works, and no money returned. Accordingly, at the end of the 50th year the cost to the general taxpayer becomes $3,946,998 on the same basis of compound interest as has been used in other charts.

Returning now to chart O, where I have a comparison of the five studies, you can see them in perspective.

No. 1. The power project is at no cost to the general taxpayer. Under normal reclamation law the cost is $2,261,925.

Under the diversion of the interest component, $3,061,925.

Under the Collbran formula, $4,390,026.

Under flood control and navigation, nonreimbursable, $3,946,998.

Realizing that many have argued against the use of compound interest and have suggested that simple interest be used, I have made additional charts. However, it should be recognized that such projects will add to the ever-mounting national debt, and therefore I believe compound interest is proper and justified.

5. Flood control and navigation: These are so-called nonreimbursable expenditures by the general taxpayer. Computations are based upon a 10-year construction period followed by a 50-year period for cost comparison purposes with no money returned. Accordingly, at the end of the 50th year the cost to the general taxpayer becomes $3,946,998.

The attached table No. 1 and charts 1, 2, 3, 4, and 5 summarize the results of these computations.

I have also prepared chart O which shows the composite cost to the general taxpayer under each of the 5 projects based upon 2½ percent compound interest on all amounts advanced for construction until such amounts have been repaid by power or irrigation. Chart A is a composite chart similar to chart O but based on simple interest at 2½ percent after the end of the 10-year development period.

Before commenting upon table I and chart O and chart A, I should like to direct your attention to charts 1 to 5 upon which I have delineated the results of computation of costs throughout 50 years after completion of the project or to the end of the so-called repayment period.

Chart 1—power project: You will note there is no cost to the general taxpayer. The power revenues repay in full the cost of constructing works and the interest during construction so that at the end of 50 years following completion of the works the project is fully paid off by power revenues in the amount of $1,148,346 of capital and $732,068 in interest, making a total cost to the power user of $1,880,414.

Chart 2—Irrigation project under reclamation law: Under reclamation law the irrigator at the end of 40 years following a 10-year development period would have returned the $1 million cost without interest. The interest charges, however, borne by the general taxpayer would have accumulated to $2,261,925.

Chart 3—Irrigation project under diversion of interest component of power revenues: A number of irrigation projects have been authorized and it has been contemplated by the Bureau of Reclamation to the interest due on electric-power capital to repay the portion of the cost the irrigators are unable to repay. In this study it is

assumed the irrigator can only repay $200,000 by the end of the 40th year while diversion of the interest component from power revenues repays $800,000, making complete paper return of the $1 million irrigation cost, without interest. It should be pointed out, however, that the interest on power revenue is a cost to the taxpayer as this sum is due as "hire" for the money. Accordingly, the cost to the general taxpayer at the end of the 40-year period is $3,261,925.

Chart 4. Irrigation under the Collbran formula

This study involves the use of the Collbran formula in which the irrigators repay $200,000 at the end of the 40th year and $280,000 by the end of the 56th year after a 10-year development period. The balance of the cost without interest of $720,000 is paid from power revenue after the power capital has been returned with interest in 50 years. This concentration of repayment at the delayed 16-year period greatly increases the interest charges to the general taxpayer, and, you will note, these costs to the taxpayer under the Collbran formula amount to $4,390,026.

Chart 5. Nonreimbursable project

This study shows the nonreimbursable project such as flood control or navigation with compound interest accumulated for 50 years after completion of the works, and no money returned. Accordingly, at the end of the 50th year the cost to the general taxpayer becomes $3,946,998.

Returning now to chart O which I have prepared for convenience, showing the costs to the general taxpayer under each of these five studies. This chart shows the high cost to the general taxpayer of the use of the Collbran formula embodied in the Colorado River storage project bills. Some may argue that compound interest should not be used in spite of the accumulating Federal debt upon which all taxpayers will pay interest. However, it should be recognized that such projects will add to the ever-mounting national debt and therefore compound interest is proper.

Senator O'MAHONEY. Does this principle apply to the Central Valley project?

Mr. MORRIS. I cannot tell you what now applies to the Central Valley project because the last analysis I saw of the Central Valley project had some proposals for use of the interest component. If they have been revised to make use of something comparable to the Collbran formula, I have not seen them.

Senator O'MAHONEY. Now, here we have in Central Valley, Calif., a project financed by the Federal Government on a stream which is not interstate in any degree whatsoever.

Mr. MORRIS. That is correct.

Senator O'MAHONEY. Every drop of water used and developed by the Federal Government through the appropriations of Congress rises within the State of California. There is a power development there to pay the costs. Do you know when it is estimated to have that Central Valley project completed and how long the period of repayment is?

Mr. MORRIS. No, I do not. I am sorry I cannot answer questions on the Central Valley project. I have a rather full-time job where I am and I am not an expert on that project. I do know that the methods of repayment have been changed from time to time and I do not know what the present basis is.

Senator O'MAHONEY. If I were to say to you that the repayments on this project which you started in 1937, is estimated to be completed in the year 2013, and that it will be paid for by the power revenues and water sales revenues derived therefrom during those years, would you conclude that that was a project in harmony with the principle you have laid down here today for use on an interstate stream governed

by a compact brought about in 1922 by the gentleman who is now president of the Hoover Commission, and which at that time included the development of the upper basin?

Do you think it is fair to come before this committee, speaking on behalf of part of California, with the enjoyment you have had at the hands of the Federal Government in the Central Valley, on a noninterstate stream, wholly within the boundaries of California, for a project of such long life to be developed out of power, and yet say as you have just said that you are opposed to the construction of public power projects to aid irrigation?

Mr. MORRIS. I am opposed to the subsidy in this matter, as I have outlined in this statement.

Senator O'MAHONEY. What about the Central Valley subsidy? Is that no subsidy?

Mr. MORRIS. There is subsidy, I know, of noninterest on irrigation projects. Beyond that I do not know the answer.

Senator O'MAHONEY. Still the Federal Government Treasury opened its doors and poured its millions into California to build the Central Valley system. We are talking about the Colorado River Basin system. I cannot avoid coming to the conclusion, Mr. Morris, that you have one rule for California and an altogether different rule for the upper basin.

Senator KUCHEL. Mr. Chairman, so that there may be no misunderstanding on the figures relative to the Central Valley projects, I wonder whether the Department of the Interior might make available to the present hearings a complete schedule of costs, payout, allocations to power, irrigators' costs, and so forth, so that we might have the specific facts involved in that?

Senator O'MAHONEY. I think it is highly desirable. I appreciate the suggestion.

Mr. Bennett, will you see that that is provided for insertion in the record at this point?

Mr. BENNETT. Yes.

(The information referred to is herewith inserted.)

Senator WATKINS. Do you find anybody in the upper basin States who are paying the bill kicking?

Mr. MORRIS. I find no place where they have agreed to pay this bill.

Senator WATKINS. You are talking about the power users, why they should be charged it. Do you find any power users in the upper basin States that are kicking about this program or objecting to it?

Mr. MORRIS. I do not find any firm agreement to purchase this power at that rate such as we provided firm agreements to purchase the Hoover Dam power.

Senator WATKINS. It will be there when we get around to authorizing it. You cannot sign an agreement in advance, and you did not either.

Mr. MORRIS. Ours was set up firm. Their offer was not firm.

Senator WATKINS. The offer will be firm when we get an authorization around to the point where we are ready to go. I have worked on these repayment contracts, and I know you cannot get a contract until you have an authorization. You have to be ready to go somewhere before you can get a contract, firm or otherwise.

CENTRAL VALLEY PROJECT INCLUDING TRINITY RIVER DIVISION AND ASSOCIATED FEATURES
POWER SYSTEM AVERAGE RATE AND REPAYMENT STUDY
AVERAGE POWER RATES USED TO COVER REVENUE DEDUCTIONS AND THE RETURN OF COSTS TO BE BORNE BY POWER
PRELIMINARY

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
		Kilowatt Hours				Operating Revenues					Revenue Deductions				
YEAR OF STUDY	FISCAL YEAR	ENERGY FOR PROJECT USE	SALE OF PROJECT SURPLUS ENERGY		TOTAL COLUMNS 3, 4, & 5	PROJECT USE	SURPLUS		OTHER ELECTRIC REVENUES	TOTAL COLUMNS 7, 8, 9, & 10	OPERATION, MAINTENANCE, & OVERHEAD	PROVISIONS FOR REPLACEMENT	OTHER EXPENSES	TOTAL COLUMNS 12, 13, & 14	NET OPERATING REVENUES Cols. 11
			FIRM	NONFIRM			FIRM	NONFIRM							
						$	$	$	$	$	$	$	$	$	$
	1943														
	1944														
1	1945		216,130,807	513,374,934	728,505,441		1,079,574	770,082	68,750	1,918,386	274,614	83,377	0	357,991	1,560,3
2	1946	2,797,000	800,110,000	647,746,234	1,450,648,234	6,980	2,899,825	971,619	75,000	3,753,424	365,434	83,377		448,811	3,304,6
3	1947	5,672,000	800,722,966	494,009,672	1,298,404,638	9,180	2,704,580	741,015	76,122	3,530,897	457,778	83,377		541,155	2,989,7
4	1948	4,792,000	800,368,995	639,492,287	1,444,643,230	11,980	2,801,752	969,731	78,000	3,861,463	679,380	576,082		1,255,412	2,605,1
5	1949	9,158,068	1,511,315,485	0	1,524,473,541	27,930	8,492,955	0	791,671	7,312,574	657,999	207,351		865,350	6,447,2
6	1950	9,725,328	1,721,241,244	0	1,730,966,570	28,456	9,314,271	0	(6,574)	9,351,153	672,278	70,519		742,796	8,588,3
7	1951	12,158,068	2,184,025,118	0	2,207,115,181	30,385	10,480,880	0	18,568	10,530,461	986,130	390,200	0	1,376,330	9,154,1
8	1952	89,908,166	1,957,419,813	513,808,897	2,611,179,576	249,834	8,283,881	1,461,221	87,966	9,982,292	1,167,253	410,000	172,897	1,749,542	8,232,7
9	1953	136,681,082	1,407,054,380	656,892,632	2,199,027,904	341,429	6,372,284	2,014,224	97,233	8,825,170	972,922	582,400	280,775	1,836,097	6,989,0
Subtotal		(236,811,707)	(11,492,358,402)	(3,363,958,427)	(15,094,929,536)	(804,072)	(50,228,900)	(6,927,922)	(1,281,786)	(59,042,680)	(6,233,786)	(2,496,863)	(633,082)	(9,163,533)	(49,879,1
10	1954	150,000,000	1,150,000,000	690,000,000	2,000,000,000	374,000	6,180,000	1,710,000	155,000	8,419,000	978,000	402,000	407,000	1,787,000	6,632,0
11	1955	177,000,000	1,360,000,000	717,000,000	2,254,000,000	442,000	6,630,000	1,730,000	385,000	9,187,000	1,319,000	431,000	1,537,000	3,287,000	5,900,0
12	1956	248,000,000	1,760,000,000	893,000,000	2,701,000,000	620,000	8,780,000	1,720,000	315,000	11,455,000	2,014,000	631,000	1,717,000	4,362,000	7,093,0
13	1957	312,000,000	1,810,000,000	894,000,000	2,715,000,000	780,000	8,880,000	1,560,000	385,000	11,605,000	2,089,000	646,000	1,887,000	4,622,000	6,983,0
14	1958	329,000,000	1,780,000,000	655,000,000	2,764,000,000	822,000	8,580,000	1,400,000	156,000	10,917,000	2,066,000	652,000	397,000	3,115,000	7,802,0
15	1959	536,000,000	1,780,000,000	661,000,000	2,777,000,000	840,000	8,530,000	1,410,000		12,718,000	2,121,000	697,000		3,175,000	7,540,0
16	1960	343,000,000	1,780,000,000	663,000,000	2,786,000,000	858,000	8,140,000	1,410,000		10,543,000	2,187,000	698,000		3,222,000	7,321,0
17	1961	551,000,000	1,850,000,000	905,000,000	3,116,000,000	878,000	8,315,000	1,920,000		11,243,000	2,418,000	698,000		3,478,000	7,770,0
18	1962	858,000,000	2,330,000,000	790,000,000	3,478,000,000	892,000	10,940,000	1,680,000		15,647,000	2,723,000	978,000		4,098,000	9,549,0
19	1963	868,000,000	2,360,000,000	888,000,000	3,610,000,000	918,000	11,010,000	1,880,000		13,957,000	2,914,000	978,000		4,789,000	9,548,0
20	1964	872,000,000	2,880,000,000	640,000,000	3,792,000,000	930,000	13,960,000	1,160,000		19,185,000	3,116,000	1,148,000		4,689,000	11,529,0
21	1965	881,000,000	2,920,300,000	610,000,000	3,811,000,000	953,000	13,990,000	1,090,000		16,168,000	3,155,000	1,148,000		4,698,000	11,470,0
22	1966	882,000,000	2,710,000,000	750,000,000	3,822,000,000	958,000	12,940,000	1,550,000		15,580,000	3,196,000	1,146,000		4,728,000	10,852,0
23	1967	882,000,000	2,750,000,000	700,000,000	3,832,000,000	955,000	13,080,000	1,480,000		15,650,000	3,815,000	1,148,000		4,768,000	10,882,0
24	1968	888,000,000	2,800,000,000	665,000,000	3,848,000,000	958,000	13,160,000	1,420,000		15,563,000	3,255,000	1,148,000		4,798,000	10,765,0
25	1969	884,000,000	2,740,000,000	754,000,000	3,888,000,000	960,000	12,790,000	1,670,000		15,455,000	3,288,000	1,146,000		4,828,000	10,627,0
26	1970	888,000,000	2,790,000,000	700,000,000	3,878,000,000	963,000	12,870,000	1,490,000		15,458,000	3,316,000	1,180,000		4,862,000	10,596,0
27	1971	886,000,000	2,850,000,000	650,000,000	3,886,000,000	966,000	12,970,000	1,390,000		15,460,000	3,348,000			4,890,000	10,569,0
28	1972	887,000,000	2,850,000,000	670,000,000	3,887,000,000	968,000	12,840,000	1,430,000		15,173,000	3,368,000			4,918,000	10,256,0
29	1973	888,000,000	2,870,000,000	640,000,000	3,898,000,000	970,000	12,700,000	1,570,000		15,175,000	3,379,000			4,926,000	10,250,0
30	1974	888,000,000	2,870,000,000	640,000,000	3,898,000,000	970,000	12,700,000	1,570,000		15,178,000	3,368,000			4,915,000	10,263,0
31	1975	889,000,000	2,840,000,000	669,000,000	3,898,000,000	975,000	12,420,000	1,430,000		14,956,000	3,358,000			4,909,000	10,048,0
32	1976	890,850,000	2,848,000,000	658,000,000	3,898,000,000	976,000	12,420,000	1,420,000		14,950,000	3,353,000			4,900,000	10,050,0
33	1977	890,000,000	2,840,000,000	668,000,000	3,898,000,000	975,000	12,420,000	1,420,000		14,950,000	3,348,000			4,896,000	10,054,0
34	1978	891,000,000	2,800,000,000	707,000,000	3,898,000,000	978,000	12,140,000	1,800,000		14,763,000	3,338,000			4,868,000	9,895,0
35	1979	891,000,000	2,800,000,000	707,000,000	3,898,000,000	978,000	12,140,000	1,800,000		14,763,000	3,328,000			4,876,000	9,879,0
36	1980	891,000,000	2,800,000,000	707,000,000	3,898,000,000	978,000	12,140,000	1,800,000		14,763,000	3,318,000			4,865,000	9,888,0
37	1981	891,000,000	2,770,000,000	737,000,000	3,898,000,000	978,000	11,880,000	1,585,000		14,558,000	3,308,000			4,850,000	9,688,0
38	1982	891,000,000	2,770,000,000	738,000,000	3,899,000,000	978,000	11,880,000	1,585,000		14,558,000	3,298,000			4,845,000	9,695,0
39	1983	892,000,000	2,770,000,000	738,000,000	3,900,000,000	980,000	11,880,000	1,585,000		14,548,000	3,298,000			4,845,000	9,685,0
40	1984	892,000,000	2,750,000,000	758,000,000	3,900,000,000	980,000	11,710,000	1,610,000		14,438,000	3,288,000			4,835,000	9,600,0
41	1985	892,000,000	2,750,000,000	758,000,000	3,900,000,000	980,000	11,710,000	1,610,000		14,438,000	3,278,000			4,825,000	9,611,0
42	1986	892,000,000	2,750,000,000	758,000,000	3,900,000,000	980,000	11,710,000	1,610,000		14,438,000	3,268,000			4,815,000	9,620,0
43	1987	892,300,000	2,730,000,000	778,000,000	3,900,000,000	980,000	11,570,000	1,650,000		14,355,000	3,258,000			4,815,000	9,520,0
44	1988	895,000,000	2,730,000,000	777,000,000	3,900,000,000	982,000	11,570,000	1,650,000		14,337,000	3,248,000			4,818,000	9,519,0
45	1989														
46	1990	Notes:													
47	1991	1. General - 1943-1945 data are historical from Bureau records. 1945 is the first year of record for Shasta Power Plant where actual operation started in June 1944. Two generators purchased for Shasta were routed to Region 1 for use at Grand Coulee from February 28, 1943, to August 15, 1947. Payment ($749,451) covered in Column 10 for 1949.													
48	1992														
49	1993														
50	1994														
51	1995														
52	1996	2. Column 3 - The energy for project use includes service to the Contra Costa Canal, Delta-Mendota Canal, North Fork and Natoma Ditches, the Shasta and Friant areas, and the Sacramento Canals.													
53	1997														
54	1998														
55	1999														
56	2000	3. Column 4 - The amounts of energy listed under firm include project surplus energy plus support energy purchased when the energy available in any one month is less than the energy required for preference agency firm load. Folsom and Nimbus Power Plants commence operation during F. Y. 1955, increasing dependable surplus capacity as supported by Pacific Gas and Electric Company from 500 MW to 665 MW. This is further increased to 740 MW with the commencement of Trinity operation. As irrigation loads increase, the dependable capacity decreases gradually to 600 MW in F. Y. 1987 and later years.													
57	2001														
58	2002														
59	2003														
60	2004														
61	2005														
62	2006														
63	2007														
64	2008														
65	2009	4. Column 10 - Includes collections (F. Y. 1952 $89,864; F. Y. 1953 $91,874) from preference customers for wheeling surcharge which in the books of account are netted against the payment to Pacific Gas and Electric Company shown in Column 14 and an allocated portion ($4,662) of F. Y. 1955 nonoperating revenues. Under ultimate conditions Column 10 includes:													
66	2010														
67	2011														
68	2012														
69	2013	195,000,000	2,730,000,000	777,000,000	3,900,000,000	982,000	11,570,000	1,650,000	135,000	14,337,000	3,248,000	1,146,000	397,000	4,818,000	9,519,0
TOTAL		22,727,811,707	167,672,358,402	47,389,958,427	237,789,929,536	86,814,072	736,868,909	101,812,921	10,081,786	934,967,688	191,847,786	66,865,683	28,213,982	286,926,535	819,045,1

Wheeling surcharge	$130,000
Nonoperating income allocated to power operations	5,000
TOTAL	$135,000

5. Column 12 - Historical data contain several adjustments for prior years. Energy to support firm load is purchased from the Pacific Gas and Electric Company at a rate equal to 1.15 times the average price per kilowatt-hour for the accumulated total of all energy sold to the Company. The annual operation, maintenance, and overhead costs chargeable to power operation after completion of the power system are estimated as follows:

Production Plant		
Operation		$432,000
Maintenance		456,000
Purchased power (400,000,000 KWH at 2.6 mills per KWH)		1,040,000
Administration and general		207,000
Subtotal		$2,435,000
Transmission System		
Operation	$ 381,000	
Maintenance	320,000	
Administration and general	162,000	
Subtotal	853,000	
TOTAL		$3,288,000

6. Column 15 - Provi... 3-percent sinking fund req... chargeable to power after ... estimated as follows:

F.P.C. Account Nu...	
322	Reserv...
331-336	Hydro...
342-349	Transm...
371-372	Genera...

9. Column 18 - Estimated cost of authorized features are as shown below:

Shasta Dam and Reservoir	$117,380,000
Keswick Dam and Reservoir	9,239,000
Friant Dam and Reservoir	22,023,000
Sly Park Dam and Conduits	7,008,000
Trinity Dam and Reservoir	90,399,000
Water Rights (Sacramento and San Joaquin Rivers)	8,295,122
Lewiston Dam and Reservoir	8,826,000
Tower House Diversion Dam	1,182,000
Tracy Pumping Plant and Intake Canal	18,800,000
Delta Fish Protection Facilities	4,500,000
Contra Costa Canal System	7,109,000
Madera Canal	3,438,000
Friant-Kern Canal	80,596,000
Delta Cross Channel	2,813,000
Delta-Mendota Canal	46,396,300
Sacramento Canals Unit	56,772,000
Lewiston-Tower House Tunnel	30,355,000
Tower House-Matheson Tunnel	31,246,000
Shasta Power Plant and Switchyard	22,473,800
Keswick Power Plant and Switchyard	$ 11,420,000
Nimbus Dam and Reservoir	8,639,000
Nimbus Power Plant and Switchyard	3,961,000
Folsom Power Plant and Switchyard	23,739,000
Folsom Dam and Reservoir (USBR construction)	69,335,000
Trinity Power Plant	12,828,000
Tower House Power Plant	7,892,000
Matheson Power Plant	8,942,000
Lewiston Power Plant	667,000
Tracy Switchyard	7,133,000
Shasta-Tracy East Side #6 Line, 230-kv	6,266,000
Shasta-Tracy West Side #1 & 2 Lines, 230-kv	11,085,800
Folsom Transmission Facilities	1,872,000
Tracy-Ygnacio Line & Substations	773,000
Trinity Transmission Facilities	30,156,000
Preference Customer Metering Facilities	470,000
Sacramento Canals Unit Transmission Facilities	984,000
Central Valley Radio Network	444,000
General Property	10,861,899
Project Investigations	975,927
Steam Plant and Sacramento Area Power Studies	121,078
Total used in Repayment Analysis	$754,913,126

Following is the cost... Central Valley Project fea... estimated power and water ...

Item	
Nonreimbursable	
Navigation	
Flood Control	
Fish and Wildlife	
Total Nonreimbursable	
Reimbursable	
Irrigation	
Municipal and Indust... Water	
Surplus Power	
Total Reimbursable	
Grand Total	

a/ Irrigation aid from S... Industrial Water Sales

b/ Irrigation aid from ... Sales (see Column 9)

TABLE 10

REGION 2

CENTRAL VALLEY PROJECT

D ASSOCIATED FEATURES

TIES

OF COSTS TO BE BORNE BY POWER

13	14	15	16	17	18	19	20	21	22	23	24	25	26
Annual Deductions				INTOME DEDUCTIONS		INVESTMENT REPAYMENT FROM POWER REVENUES							
				REPAYMENT OF INVESTMENT		PLANT IN SERVICE AT END OF YEAR							
						INTEREST BEARING		INTEREST FREE					
TRIBUTED ON AMORTIZEMENT	OTHER EXPENSES	TOTAL COLUMNS 12, 13, & 14	NET OPERATING REVENUES Cols. 11-15	3% INTEREST	PRINCIPAL	TOTAL	BALANCE TO BE REPAID	TOTAL	BALANCE TO BE REPAID	UNAPPLIED INTEREST CUMULATIVE	EARNED SURPLUS CUMULATIVE	FISCAL YEAR	YEAR OF STUDY
$	$	$	$	$	$	$	$	$	$	$	$		
						2,216,833	2,216,833					1943	
						13,713,883	13,713,883					1944	
83,377	0	357,991	1,880,395	411,406	1,148,989	15,668,300	14,519,311			411,406	0	1945	1
85,377		448,811	5,304,415	435,576	2,868,854	18,984,742	11,996,939			846,986		1946	2
85,377		541,155	2,889,742	359,008	2,650,734	18,058,255	9,409,676			1,205,993		1947	3
176,082		1,255,412	2,608,081	282,290	2,320,791	24,580,701	15,611,385			1,488,283		1948	4
207,551		886,380	6,447,274	554,816	5,912,408	34,650,756	19,769,000			2,025,099		1949	5
72,619		762,795	8,988,389	583,070	7,995,288	52,749,295	29,872,251			2,816,189		1950	6
380,200	0	1,576,380	9,154,081	896,166	8,257,915	61,686,975	30,682,018			3,812,837		1951	7
413,200	172,397	1,749,542	8,232,780	916,561	7,316,109	78,491,530	40,040,356			4,428,898		1952	8
387,400	280,776	1,826,087	6,999,073	1,201,211	5,797,862	90,812,702	56,643,494			5,630,105		1953	9
496,683)	(433,082)	(9,163,533)	(49,679,117)	(5,650,109)	(44,749,008)							Subtotal	
602,000	407,000	1,787,000	6,832,000	1,096,911	5,535,089	88,880,000	37,075,905			6,727,010		1954	10
631,000	1,537,000	2,287,000	5,900,000	1,112,277	4,787,723	123,088,000	68,496,180			7,839,287		1955	11
651,000	1,717,000	4,362,000	7,075,000	2,084,925	5,010,176	124,172,000	64,582,005			9,894,122		1956	12
666,000	1,867,000	4,622,000	6,985,000	1,937,460	5,045,540	126,145,000	61,509,485			11,831,582		1957	13
682,000	597,000	3,118,000	7,802,000	1,845,284	5,956,716	128,412,000	57,819,749			13,676,866		1958	14
697,000		3,175,000	7,540,000	1,734,592	5,805,408	130,430,000	54,052,341			15,411,458		1959	15
698,000		3,222,000	7,521,000	1,620,970	5,700,030	135,745,000	50,645,311			17,052,428		1960	16
658,000		3,475,000	7,770,000	1,609,359	6,160,641	211,081,000	122,822,670			13,841,787		1961	17
978,000		4,098,000	9,849,000	3,684,680	6,864,320	211,081,000	116,966,350			22,526,467		1962	18
978,000		4,289,000	9,648,000	3,508,751	6,139,249	280,221,000	179,969,101			25,835,219		1963	19
148,000		4,689,000	11,526,000	5,398,773	6,127,227		173,841,874			31,233,991		1964	20
148,000		4,698,000	11,479,000	5,214,956	6,266,044		167,576,830			36,448,947		1965	21
146,000		4,728,000	10,667,000	5,027,805	5,824,695		161,752,135			41,476,252		1966	22
148,000		4,768,000	10,692,000	4,852,644	6,089,436		155,712,699			46,328,896		1967	23
148,000		4,798,000	10,865,000	4,671,381	6,193,619		149,519,080			51,000,197		1968	24
148,000		4,828,000	10,527,000	4,485,672	6,141,428		143,377,652			55,485,769		1969	25
198,000		4,862,000	10,586,000	4,301,330	6,284,670		137,092,982			59,787,099		1970	26
		4,895,000	10,585,000	4,112,489	6,472,511		130,620,471			63,899,588		1971	27
		4,918,000	10,258,000	3,918,914	6,339,086		124,291,385			67,818,502		1972	28
		4,928,000	10,280,000	3,728,742	6,521,258		117,770,127			71,547,244		1973	29
		4,915,000	10,282,000	3,533,104	6,726,896		111,043,231			75,080,348		1974	30
		4,905,000	10,058,000	3,331,297	6,721,708		104,321,523			78,411,645		1975	31
		4,900,000	10,040,000	3,129,646	6,920,354		97,401,174			81,541,291		1976	32
		4,886,000	10,065,000	2,922,035	7,132,965		90,268,209			84,463,326		1977	33
		4,888,000	9,868,000	2,708,046	7,159,954		83,108,255			87,171,372		1978	34
		4,878,000	9,879,000	2,493,248	7,384,752		75,723,503			89,664,620		1979	35
		4,965,000	9,888,000	2,271,706	7,616,294		68,107,209			91,936,325		1980	36
		4,850,000	9,688,000	2,043,216	7,639,784		60,467,424			93,979,541		1981	37
		4,845,000	9,693,000	1,814,026	7,878,977		52,588,447			95,793,584		1982	38
		4,845,000	9,895,000	1,577,688	8,117,347		44,471,100			97,371,217		1983	39
		4,838,000	9,800,000	1,334,133	8,265,867		36,205,233			98,706,380		1984	40
		4,825,000	9,611,000	1,086,157	8,523,843		27,681,390			99,791,807		1985	41
		4,815,000	9,630,000	830,442	8,799,558		18,881,832			100,621,949		1986	42
		4,815,000	9,520,000	566,755	8,953,245		9,928,587			101,188,704		1987	43
		4,818,000	9,522,000	298,158	9,223,842		714,745			101,488,862		1988	44
				21,442	9,800,558		0	66,635,600	57,849,787	101,488,304		1989	45
				0	9,822,000				48,327,787			1990	46
r ultimate conditions					9,822,000				38,505,787			1991	47
					9,822,000				28,683,787			1992	48
00					9,822,000				19,761,787			1993	49
00					9,822,000				10,239,787			1994	50
00					9,822,000				717,787		↓	1995	51
					717,787				0		0	1996	52
					0						8,804,213	1997	53
											18,326,213	1998	54
											27,848,213	1999	55
											37,370,213	2000	56
											46,892,213	2001	57
											56,414,213	2002	58
											65,936,213	2003	59
											75,458,213	2004	60
											84,980,213	2005	61
											94,502,213	2006	62
											104,024,213	2007	63
											113,546,213	2008	64
											123,068,213	2009	65
											132,590,213	2010	66
											142,112,213	2011	67
											151,634,213	2012	68
2,268,000											161,156,213	2013	69
2,268,000													
2,438,000													
1,040,000													
207,000													
832,000													
161,000													
320,000													
162,000													
933,000													
3,268,000													
116,884	397,884	4,815,000	9,522,000	0	0	280,221,000	0	66,635,600	0	101,488,304	170,678,213		
665,983	28,218,882	865,924,823	619,043,117	101,808,304	348,896,600	280,221,000	0	66,635,600	0	101,808,304	170,678,213		TOTAL

6. Column 15 - Provisions for replacement are computed on a 3-percent sinking fund basis. The provisions for replacement chargeable to power after assumed completion of the system are estimated as follows:

P.F.C. Account Numbers		
322	Reservoir and Waterways	$ 28,000
321-326	Hydroelectric Plant	666,000
342-349	Transmission Plant	999,000
371-379	General Plant	87,000
		$1,150,000

7. Column 24 - Historical data include wheeling surcharges ($121,559) for Fiscal Years 1952 and 1953, and an allocated portion ($34,861) of 1953 nonoperating expenses. Other expenses chargeable to power after assumed completion of the system are estimated as follows:

Wheeling cost - 1 mill/KWH	$220,000
Wheeling surcharge	130,000
Nonoperating (Allocation)	47,000
TOTAL	$397,000

8. Interest is calculated at 3% per year on the unamortized interest-bearing investment at end of the previous year (column 20). The 1949 figure includes $66,476 applicable to 1944.

Following is the cost allocation and probable repayment of the Central Valley Project features, including Folsom Dam, based on the estimated power and water accomplishments:

Item	Cost Allocation	Probable Repayment
Nonreimbursable		
Navigation	$ 8,055,000	--
Flood Control	44,999,000	--
Fish and Wildlife	1,478,000	--
Total Nonreimbursable	$54,532,000	
Reimbursable		
Irrigation	599,578,000	$324,392,600
Municipal and Industrial Water	20,782,000	29,131,900 a/
Surplus Power	280,221,000	348,896,600 b/
Total Reimbursable	$700,581,000	$702,421,500
Grand Total	$754,913,000	

a/ Irrigation aid from Municipal and Industrial Water Sales $8,349,900

b/ Irrigation aid from Surplus Power Sales (see Column 21) $66,635,600

10. Columns 20 and 22 - The principal accruals of Column 18 are first credited to amortization of the interest-bearing investment and next to amortization of the interest-free investment.

11. Surplus shown as accumulating through the 50th year after the last major features (Trinity Dam, Reservoir, and Power Plant) are placed in service in F. Y. 1963.

Prepared by Edward J. Tarbox Date March 4, 1954

Historical financial data certified correct.

Acting Regional Control and Finance Officer

Recommended: Regional Planning Engineer

Approved: Regional Director

416-208-62

Mr. MORRIS. In my belief a very great error of judgment is being made in saddling upon that area seeking industry a high power rate, and have that rate continue for a hundred years. I think it is a great mistake.

Senator WATKINS. Is it not a fact that you want the power from Glen Canyon, and you are afraid you will have to pay that rate in order to get it?

Mr. MORRIS. We would like to have low-cost power, obviously, if it is available.

Senator WATKINS. You want Glen Canyon built, do you not?

Mr. MORRIS. Glen Canyon?

Senator WATKINS. Yes. Do you not want that built? You are not opposed to it, are you?

Mr. MORRIS. It depends on the manner of its authorization.

Senator WATKINS. If you get it and buy the power at the rate you have fixed on this loan, you would be interested in that?

Mr. MORRIS. We would be interested in bidding on power at the power costs which can be generated at that site.

Senator WATKINS. And at that cost?

Mr. MORRIS. Not at the 6 mills.

Senator WATKINS. You object to the upper basin getting any help from the power revenues of Glen Canyon, do you not?

Mr. MORRIS. I think, Mr. Senator——

Senator WATKINS. Could you answer that? Do you or do you not object?

Mr. MORRIS. To their getting power?

Senator WATKINS. Getting some help from the power revenues out of the Glen Canyon project to help build, or take advantage of the opportunity to build that system?

Mr. MORRIS. I object to it as set out in Senate bill 500.

Senator WATKINS. What kind of bill would you propose that would help them go ahead?

What I am asking you is a specific question, whether you object to their getting help from the power revenues that come out of Glen Canyon?

Mr. MORRIS. There are all varieties of help, Mr. Senator. What I have before me is Senate bill 500, and I object to the manner in which it is set out in Senate bill 500.

Senator WATKINS. You are not answering my question.

Mr. MORRIS. When you say "any help" you get down to such a small amount that it might not be objectionable. I do not know. I have not anything specific before me to comment on, excepting Senate bill 500.

Senator WATKINS. As a matter of fact, you people contemplate getting power from Glen Canyon, do you not?

Mr. MORRIS. We did not get a drop from Davis and we are the largest public power agency in the area.

Senator WATKINS. If you do not buy any of the power, and the people in the upper-basin States, the power users there, do not object, why should you object?

Mr. MORRIS. I am just giving my comment on this, as I feel a great mistake is being made with any thought of saddling upon those people in that area for a hundred years power at 6 mills.

Senator WATKINS. If they are willing to pay it, why should California object? Out of sympathy you have for us up there, or are you afraid we will not get some industry?

Mr. MORRIS. As I shall mention here, Senator, I do not believe that you can sell 6-mill power for a hundred years. I do not believe that the proposals in S. 500 are sound. I believe that the price of power will fall below 6 mills, and that you cannot sell it at that rate and that you will not have the funds available for the repayment on the specific participating projects set forth to be developed by 6-mill power.

Senator WATKINS. We will, of course, have offers of parties for firm power at that rate sufficient to pay this out in the number of years provided for in this bill. There is no doubt about that. We have utility companies that know their business, and they know about all of this so-called cheap power you are talking about, and yet they are willing to sign for it. They told this committee twice now, and they told the House committee once.

Mr. MORRIS. I should say two things on that. One is that I read closely the statement prepared by the nine power companies and agreed to by a tenth power company, and I could not find in it any positive statement that they would take the power at such prices.

Senator WATKINS. I would say it was discussed with them and they are willing to take it, and so indicated.

Mr. MORRIS. I should say further that your industries and population in the area should express their views about being saddled for this high-priced power.

Senator WATKINS. How could they do it better than through their representatives and the almost unanimity with which they are supporting this project? Through the legislatures, they have all memorialized Congress to go ahead with this program. They are the people who are going to pay the bills. They are also going to use part of that water. It is a community project. The four States have pooled their resources on this. They have pooled their interests. They are willing to pay the bills They are not asking southern California to take any of this power.

Mr. MORRIS. As I shall say in this statement later, if power is available, as we believe it will be available, from the atom, at less price than this, regardless of anything that the people now say, you cannot sell 6-mill power if you are going to have power at 3 mills or 4 mills or some other price there, produced by a rival method.

Senator WATKINS. I have talked with some of the people who are interested in the development of nuclear power, and it probably would surprise you to know that they said there should never be any letdown in the building of these hydroplants. Nuclear power will not for a long time to come be available to interfere at all with the price that would be charged to repay the cost of these hydroplants. I can cite you one, if you want to check with him, and that is Admiral Rickover. I have checked on this matter and I am prepared to show to this committee that that argument is, in the present light we have, ridiculous.

Mr. MORRIS. But building a hydroelectric-power dam project to produce power around 4 mills and sell it is one thing, because the operating cost of that, once you have it built, is relatively low, but to put a surcharge on that power of another couple of mills and say you are going to do that for a hundred years in the future to take

care of participating projects yet unborn. I do not think is sound economics.

Senator WATKINS. It is sound economics if the overall income is sufficient to do the job. You did not know when you built some of these other plants you were going to be able to pay for them for so many years, but you have been. Of course you have had a lot of so-called dump power out of the Hoover Dam that you bought at a bargain and it turned out to be firm power largely because you had the water coming from the upper basin States to make it firm. You have done that. Of course that has been a help to you downstream.

Mr. MORRIS. That will be discussed by one of my colleagues.

Senator WATKINS. I understand it will be. But I can see some motives other than sympathy for the people in the upper basin States.

Of course, you would like to have the Glen Canyon built. You cannot blame us for being just a little bit indignant that you are basing it on the sympathy you have for the power users in the upper basin States.

Mr. MORRIS. I might say I am interested in public power. I am past president of the American Public Power Association.

Senator WATKINS. I am dealing now with the specific object of your interest, to wit, the people of the upper basin States. They ought to be interested in their own welfare. They do not want to saddle themselves with burdens they cannot pay. They have seen it developed along your way in central California under this program. They have seen it in the lower basin. They have seen you develop water until you have enough to take care of an additional 4 million, according to the statement made by the chairman of your metropolitan district down there. We have seen all of that taking place. When we are in the game, when our turn to go to bat comes up you want to call the game, you want to stop us now.

Mr. MORRIS. When we went into the game we agreed to pay everything and retire it, with interest.

Senator WATKINS. The Coachella Valley does not pay anything on the cost of the Hoover Dam? The power users of California have to pay for that.

Mr. MORRIS. They pay under the reclamation law.

Senator WATKINS. Not the cost of the Hoover Dam that has been allocated to the Coachella Valley?

Mr. MORRIS. That is correct.

Senator WATKINS. All right; they are getting the benefits.

Mr. MORRIS. But it is being paid for by the people of southern California.

Senator WATKINS. Certainly, and that is what we intend to do upstream.

Mr. MORRIS. If I may continue, I will cite what I believe is the inherent difficulty of contracting to pay 6 mills this long time in the future.

Steam-produced power is being furnished to the Atomic Energy Commission at around 4 mills. Why should the people in the Mountain States sitting on this enormous potential energy be called upon to pay a 50 percent higher rate for the next 100 years?

I have prepared similar studies based upon 2½ percent simple interest as suggested by some, fallacious, I believe, with the growing

national debt. Under each of these studies I have assumed that the Federal taxpayer, in addition to paying interest, returns to the project the portion of the capital cost, including compound interest during the construction period and during the development period, and not repaid by irrigation or power. He does this in a straight line of capital repayment so that at the end of the study period all capital has been returned by either power, irrigation, or the general taxpayer.

While I have prepared individual charts in each of the 5 cases, I am submitting only chart A which summarizes the cost to the general taxpayer at 2½ percent simple interest under each of the 5 projects in a manner similar to chart O which was computed with 2½ percent compound interest. It is interesting to note that even by simple interest under existing reclamation law with capital returned in 40 years after a 10-year development period the simple interest cost to the taxpayer is $1,223,345 for a million-dollar project. In other words, a million-dollar project will cost the irrigator $1 million, and the general taxpayer $1,223,345, a combined cost of $2,223,345. While under the Collbran formula the same million-dollar project would cost the taxpayer $1,877,340 which is almost as great as the cost by use of the interest-component method.

These studies indicate the importance of inclusion of the interest costs to the already heavily indebted general taxpayer. These costs should be reported in an official aboveboard manner and should not just be covered by a hidden subsidy. It is a cost borne by the general taxpayer and, as stated earlier, opponents and proponents alike should have access to the same figures.

It appears most unfortunate that the Congress should be asked to approve a billion and a half dollar project involving hidden costs to the taxpayer of the order of $4 billion, through accumulated interest costs under the Collbran formula. This at a time when Congress is awaiting the recommendations of the Hoover Commission which it, itself, created, and the report of the Cabinet Water Policy Committee named by the President. Both of these are expected to make specific recommendations regarding methods of determining feasibility, financing, and repayment of Federal water projects.

I, therefore, urge that the Colorado River storage project and participating projects not be authorized pending analysis under such new and uniform policies for the financing, construction and repayment of Federal water projects as the Congress may adopt after receipt of these important water policy reports.

Public power: As one directing the management of a large city-owned public power enterprise serving more than 2 million people I cannot refrain from recording my objection to the setting up of these large water storage-power projects on the main stems of the Colorado River, not for the purpose of furnishing power at low rates but for the primary purpose of serving as cash registers for the collection of excessive rates for a hidden subsidy for the so-called participating projects. This is an assortment of irrigation projects in which the irrigators are able to repay little more than 10 percent of their cost in 50 years, without interest.

Testimony of my associates in opposition to S. 500 clearly shows that these storages are not required to permit the full diversion of the quantities of water required for the participating projects named in

this bill without causing the flow at Lee Ferry to fall below 75 million acre-feet under any reoccurrence of drought such as has occurred in the past.

Other testimony of my associates indicates that power generated at Glen Canyon Dam will cost very much less than the 6 mill rate proposed to subsidize irrigation, and power at other more expensive sites.

Glen Canyon power cost estimate summary

	Power at bus bar	Power delivered 250 miles
	Mills per kilowatt-hour	*Mills per kilowatt-hour*
1. Power allocation to be returned with 2½ percent interest in 50 years	3.10	3.73
2. Power allocation to be returned with 2½ percent interest, and irrigation allocation without interest in 50 years	3.41	4.04
3. Total cost of dam and powerplant to be repaid with 2½ percent interest in 50 years	3.67	4.30

Not only is it proposed to charge this artificially high rate of 6 mills but to continue this charge for decades after the power investment has been returned with interest in order that subsidy may be provided for at least a hundred years, according to the testimony of proponents I have heard this week.

Why should power users be called upon to pay this high rate for a century in an area described by the 9 or 10 privately owned electric utilities at page 556 of the published transcript of hearings on H. R. 4449 of 1954, in part as follows:

*** * * this basin is one of the greatest sources of thermal energy production to be found anywhere in the world. Here are located vast deposits of coal, great underground reservoirs of natural gas and oil, mountains of oil shale, and, perhaps more important than all these are the deposits of uranium ores. The potential thermal power resources of this area stagger the imagination.**

Steam-produced power is being furnished to the Atomic Energy Commission at around 4 mills. Why should the people in the Mountain States sitting on this enormous potential energy be called upon to pay a 50 percent higher rate for the next 100 years?

Under H. R. 4488 presented to your committee and supported by Governor Johnson in his testimony March 1, 1955, appears the astounding philosophy:

***Provided*, That power produced pursuant to this act shall be sold at the highest practicable price to enhance the development of the upper Colorado River Basin.**

How shall the potential industrial intermountain empire be developed under such a philosophy of high cost power in comparison to the low-rate policies in the Pacific Northwest, TVA, the St. Lawrence, Niagara Falls, and elsewhere throughout the United States?

Naturally, I would be in favor of the economic development of hydroelectric power marketed under the provisions of the 1944 Flood Control Act which provides that power shall be disposed of "in such manner as to encourage the most widespread use thereof at the lowest possible rates for consumers consistent with sound business principles."

This is not only sound for public power but is the recognized principle of all public regulatory bodies in fixing the rates of privately owned public utilities. The inclusion of costs not pertinent and re-

quired in the necessary production of power would not be allowed by any such regulatory body. Why should the Congress of the United States violate such universally recognized principle of rate fixing?

Isn't it completely unrealistic that such 6-mill rate should be extended for 100 years in spite of the almost universal optimism that power production costs will be lowered by production of atomic power? Scientists have told us that the cost of uranium if it could be 100 percent converted to electric energy would be only 0.013 mills per kilowatt-hour, or about one two-hundredths of the cost of fuel consumed in conventional steam-electrical plants. During my professional experiences of about 45 years the efficiency of fuel-steam power has increased 200 percent until we are now converting 35 percent of the energy of fuel into electricity. How long will it be before we can economically convert just 1, 2, or perhaps 5 percent of atomic energy into useful electricity? Many believe the time is almost at hand—certainly not more than a decade or two. Such accomplishment would make unsalable power at the 6 mills planned for the next 100 years.

Conclusion: We have in S. 500 and similar bills and extraordinary effort to speed the expenditure of 1½ billions in authorization of uneconomic projects, many not fully reported on, to be paid for in part by artificially high-cost power which may lose its market to lower cost competing power.

To do this it is proposed to embrace a series of departures from existing general water policy without awaiting the enactment of new policies following receipt of the Hoover Commission and Cabinet Water Policy Committee reports. I refer to: (1) The adoption of the one-basin-account idea, (2) the use of the Collbran formula or modified Collbran formula, (3) the fixing of artificially high power rates for a century to come in violation of the 1944 Flood Control Act, and of good, sound business practice, and (4) the adoption of an open-end financial subsidy for projects yet unborn anywhere in the upper basin States.

Surely there is no crying shortage of foodstuffs or other agricultural need which should demand such haste in authorization and expenditure of a billion and a half dollars.

I, therefore, again urge that S. 500 and similar bills for the Colorado River storage and participating projects be not adopted.

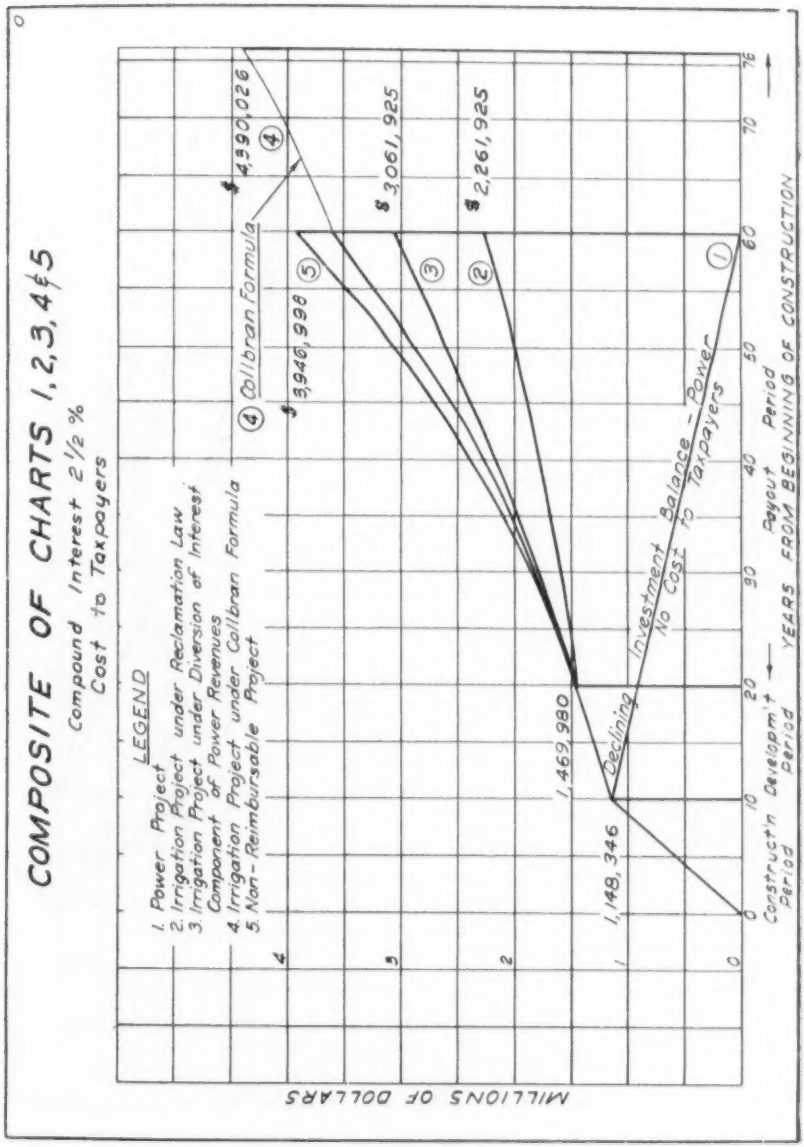
(The tables and charts referred to are as follows:)

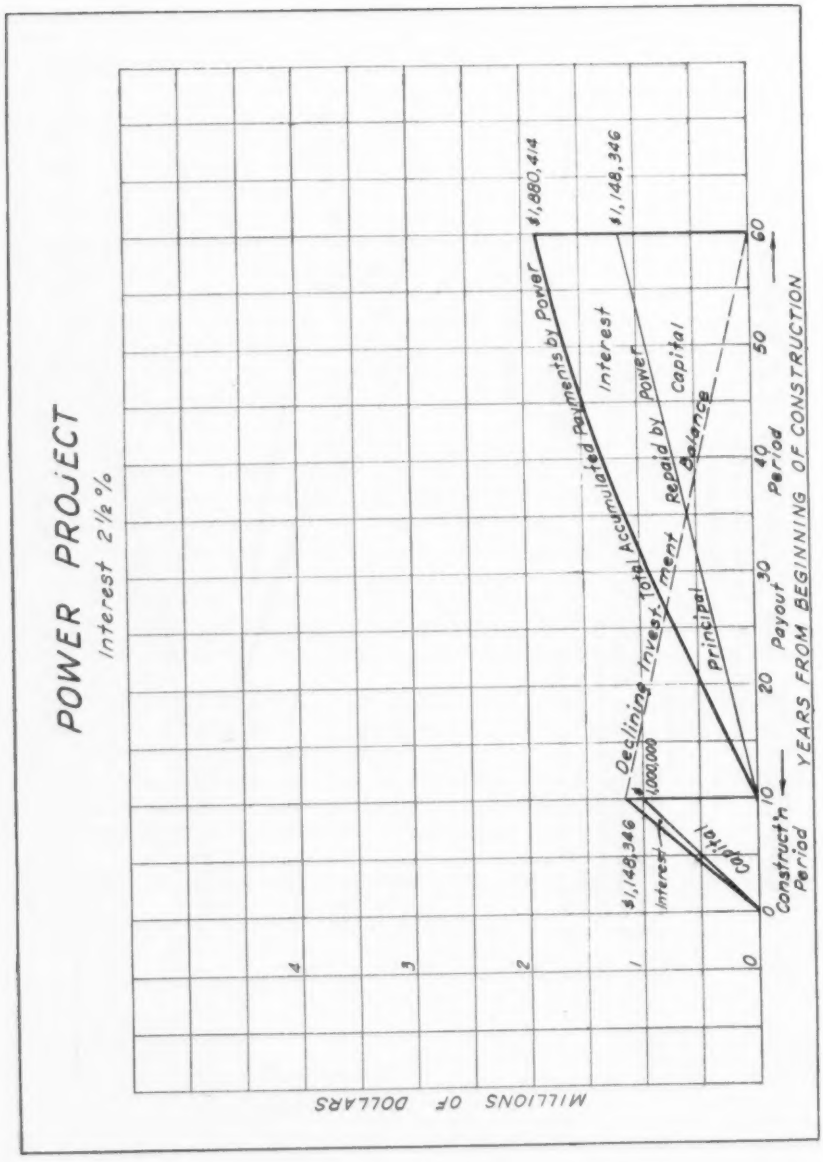
TABLE I.—*Accumulated cost to taxpayers end of period, $1 million project at 2½ percent interest*

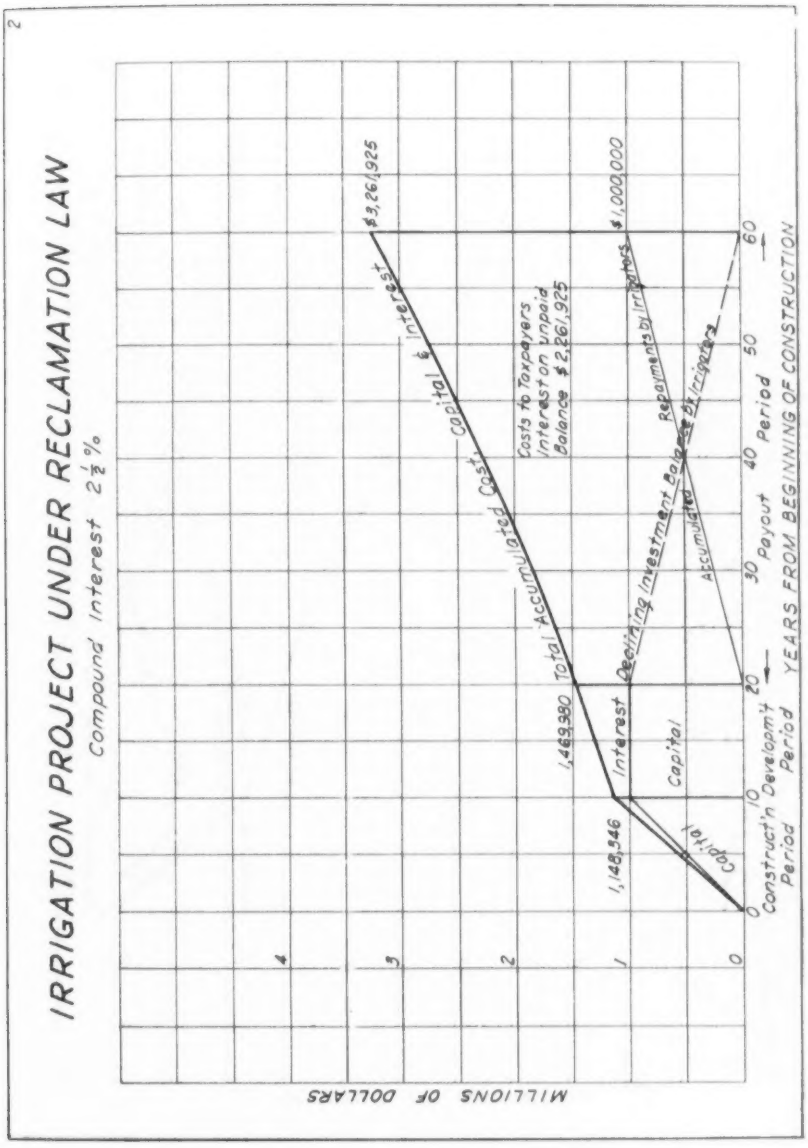
	Compound interest	Simple interest
1. Power		
2. Irrigation reclamation law	$2,261,925	$1,223,345
3. Use of interest component	3,061,925	2,023,345
4. Collbran formula	[1] 4,390,026	[1] 1,877,340
5. Nonreimbursable flood control and navigation	3,946,998	2,492,916

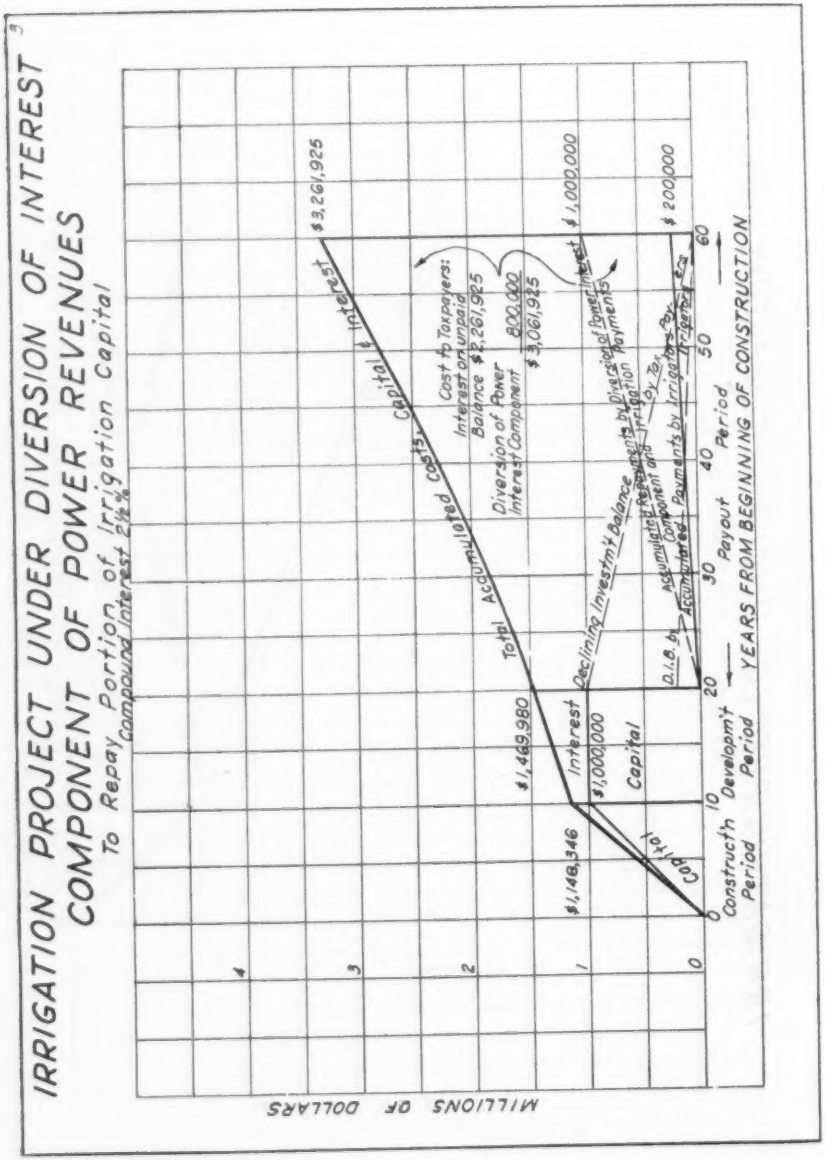
[1] End of the repayment period is 50 years after completion of construction under each project except under the Collbran formula for which repayment extends to the 64th year.

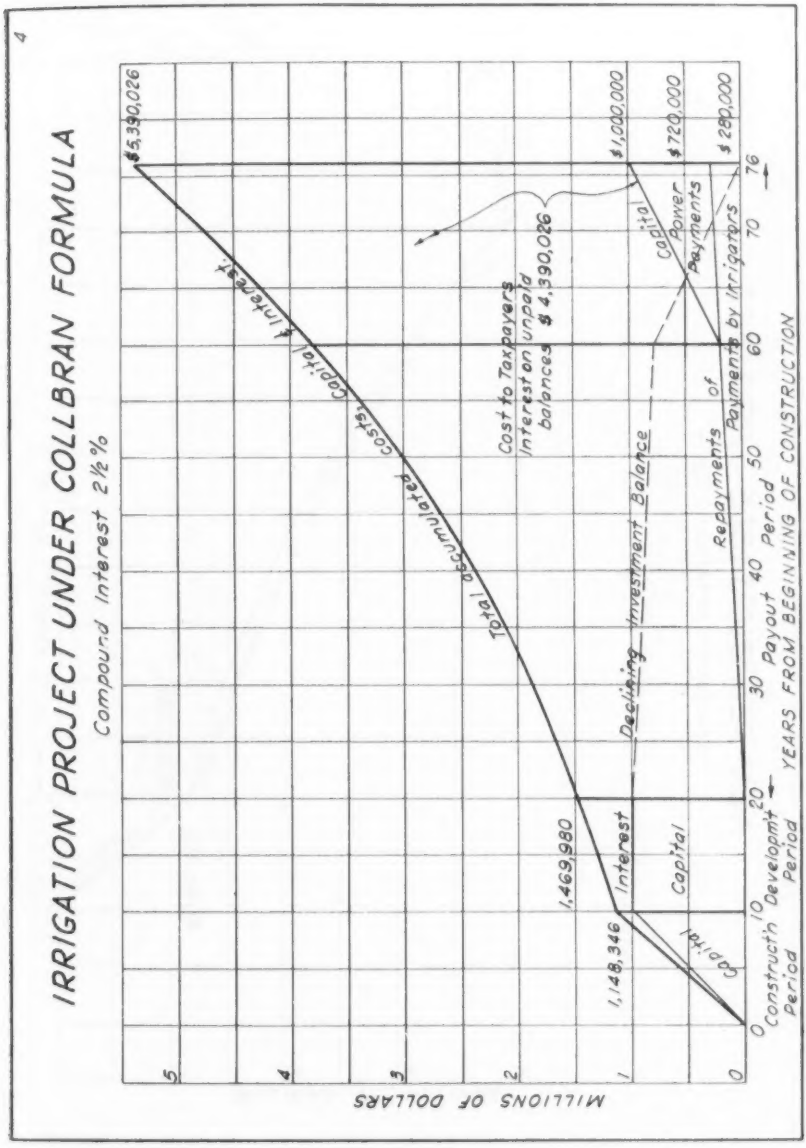
NOTE.—Under compound interest column no capital repayment is made except by power and irrigation. Under simple interest, it is assumed that the capital not repaid by power or irrigation is charged to the taxpayer and repayment is made in equal annual capital repayments to end of the period of study.

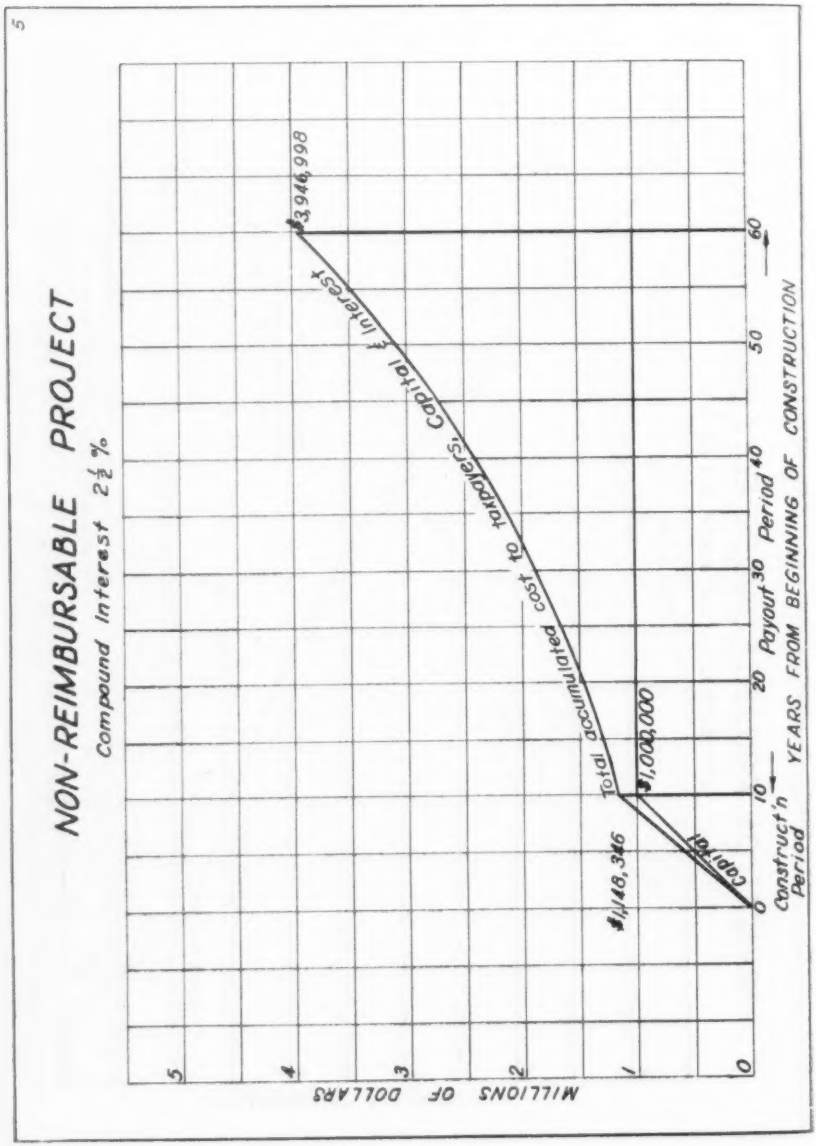

COMPOSITE OF CHARTS 1, 2, 3, 4 & 5
Compound Interest 2½ %
Cost to Taxpayers
LEGEND
1. Power Project
2. Irrigation Project under Reclamation Law
3. Irrigation Project under Diversion of Interest Component of Power Revenues
4. Irrigation Project under Colbran Formula
5. Non-Reimbursable Project
④ Colbran Formula
$4,990,026
$3,946,998
$3,061,925
$2,261,925
1,469,980
1,148,346
Declining Investment Balance - Power No Cost to Taxpayers
MILLIONS OF DOLLARS
Construction Development Period
Payout Period
YEARS FROM BEGINNING OF CONSTRUCTION

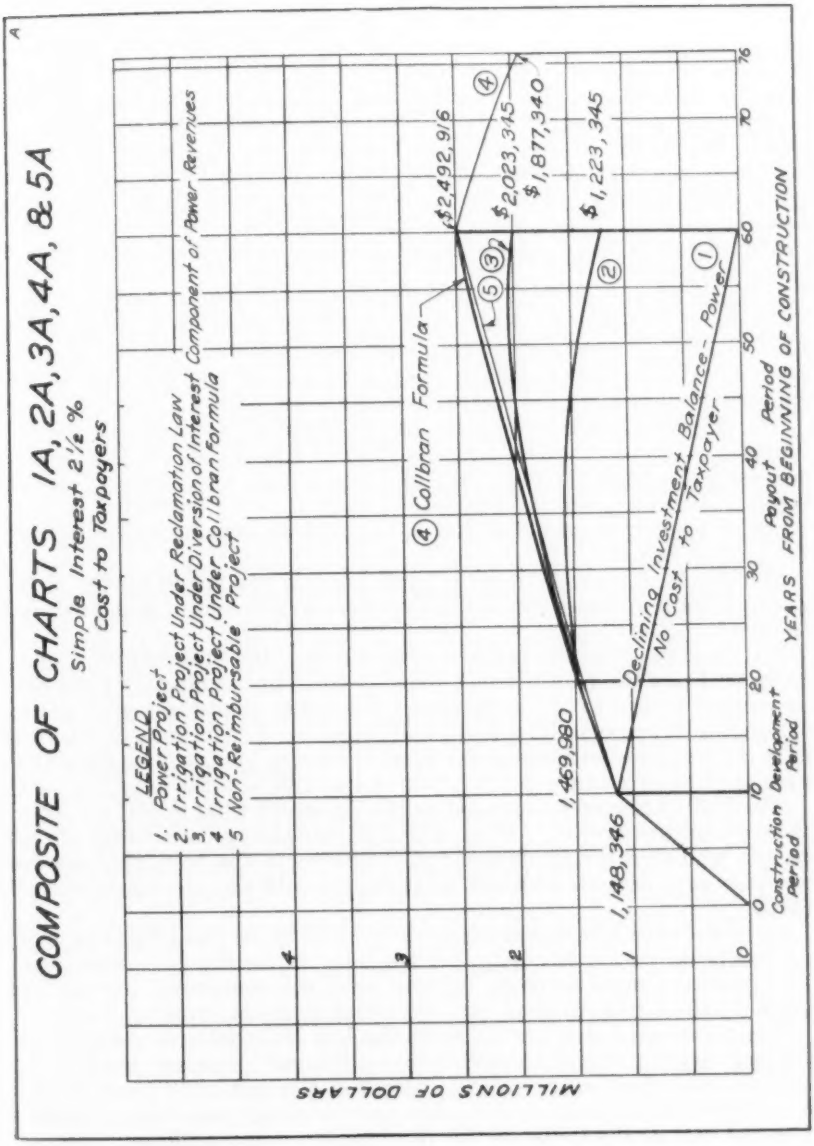

POWER PROJECT
Interest 2½%
MILLIONS OF DOLLARS
0
1
2
3
4
$1,148,346
Interest
Capital
Declining Investment
Total Accumulated Payments by Power
$1,880,414
Interest
$1,148,346
Repaid by Power
Capital
Balance
Principal
0
10
20
30
40
50
60
Construct'n Period
Payout Period
YEARS FROM BEGINNING OF CONSTRUCTION


IRRIGATION PROJECT UNDER RECLAMATION LAW
Compound Interest 2½%
MILLIONS OF DOLLARS
$3,261,925
Capitol & Interest
Accumulated Cost
Costs to Taxpayers
Interest on Unpaid
Balance $2,261,925
1,483,380
Total
Interest
Declining Investment
Repayments by Irrigators
$1,000,000
1,148,546
Capitol
Accumulated Balance of Irrigators
0
10
20
30
40
50
60
Construction Period
Development Period
Payout Period
YEARS FROM BEGINNING OF CONSTRUCTION


IRRIGATION PROJECT UNDER DIVERSION OF INTEREST COMPONENT OF POWER REVENUES
To Repay Portion of Irrigation Capital
Compound Interest 2½%
MILLIONS OF DOLLARS
4
3
2
1
0
Total Accumulated Costs, Capital & Interest
$3,261,925
Cost to Taxpayers:
Interest unpaid
Balance $2,261,925
Diversion of Power
Interest Component
800,000
$3,061,925
$1,469,980
Interest
Declining Investm't Balance
$1,000,000
Capital
$1,148,346
Capital
Diversion of Power Interest
Payments
$1,000,000
D.I.P. Payments by Irrigation Pay-back Ex.
Accumulated Repayments by Diversion of Power Interest Component and Irrigation Payments by Irrigation Pay-back Ex.
$200,000
0
10
20
30
40
50
60
Construct'n Period
Developm't Period
Payout Period
YEARS FROM BEGINNING OF CONSTRUCTION


IRRIGATION PROJECT UNDER COLLBRAN FORMULA
Compound Interest 2½%
MILLIONS OF DOLLARS
5
4
3
2
1
0
$5,390,026
1,469,980
1,148,346
Total Accumulated Costs
Capital
Interest
Cost to Taxpayers
Interest on unpaid balances $4,390,026
Declining Investment Balance
Interest
Capital
Capital
$1,000,000
$720,000
$280,000
Capital
Power
Payments
Repayments of Payments by Irrigators
0 Construction Period
10 Development Period
20
30 Payout Period
40
50
60
70
76
YEARS FROM BEGINNING OF CONSTRUCTION


NON-REIMBURSABLE PROJECT
Compound Interest 2½ %
MILLIONS OF DOLLARS
0
1
2
3
4
5
Construct'n Period
10
20
30
40
50
60
YEARS FROM BEGINNING OF CONSTRUCTION
Payout Period
$1,148,346
$1,000,000
$3,946,998
Total accumulated cost to taxpayers, Capital & Interest
Capital


COMPOSITE OF CHARTS 1A, 2A, 3A, 4A, & 5A
Simple Interest 2½ %
Cost to Taxpayers
LEGEND
1. Power Project
2. Irrigation Project Under Reclamation Law
3. Irrigation Project Under Diversion of Interest Component of Power Revenues
4 Irrigation Project Under Colbran Formula
5 Non-Reimbursable Project
MILLIONS OF DOLLARS
4
3
2
1
0
④ Colbran Formula
$2,492,916
⑤
③
④
$2,023,345
$1,877,340
$1,223,345
②
1,469,980
1,148,346
Declining Investment Balance - Power
No Cost to Taxpayer
①
0
10
20
30
40
50
60
70
76
Construction Development Period
Payout Period
YEARS FROM BEGINNING OF CONSTRUCTION

Senator WATKINS. I would like to call Mr. Morris' attention to one statement. I do not have all the breakdown on this. This is a summary.

Based on this method of charging 2½ percent interest that is used by Governor Miller and others, Mr. Morris, in figuring the total cost of the irrigation and the reclamation project, that is money without interest, we find that in the present plans for the flood control in Los Angeles County, based on that method, this method of analysis, the recent plans for flood control of Los Angeles County—the principal is not to be paid at all—it will cost the taxpayers of the Nation $1.3 billion in the next 50 years, at the end of 50 years nothing has been paid, and another 50 years' more interest can go on at 2½ percent, and you can go on ad infinitum for the full length of the life of the project.

Mr. MORRIS. Does that statement give the amount of expenditure made so far?

Senator WATKINS. This is on the recent plan for flood control. We do have the figures on how much has been spent in Los Angeles County area on flood control in the past and the total cost to the taxpayers. We do not even have the principal. If you put that on to the principal you get the total cost you get out of the Treasury.

Mr. MORRIS. I would like to insert, however, regarding the Los Angeles taxpayer, the Los Angeles County Flood Control District is currently spending $179 million of a bond issue and has previously spent a somewhat similar amount, so there is being expended in Los Angeles County an amount that is as great as is being expended by the United States.

Senator WATKINS. I know, but just because you spend money, that does not make it necessary for the Federal Government to spend money to give it to you?

Mr. MORRIS. I think it is a pretty good test, if the States of the upper basin will pay their own money directly into this, separately from the amounts returned by the irrigators, I think that would be a good plan.

Senator WATKINS. It would be cheaper for Uncle Sam to let you have this money without interest, and require you to pay back the principal, than require you to make a contribution the way you are.

The United States does not get anything except what it will get from the reclamation project. Most of that goes to the private benefit of the people who own the lands and the businesses in the area, yet they do not pay anything back except what they would pay through general taxes.

Here we have a reclamation project whereby on the irrigation end of it only do we get any help, but we have to pay the principal back. It is just as simple as that. If you have the compound interest on these flood-control projects, you have astronomical sums.

You have one here, for instance, the last bill that was passed, the current rivers and harbors bill, $822 million with interest at 2½ percent compounded, which would amount at the end of 50 years to $2,827,700,000. The principal in this case is never paid back. Therefore the cost of the taxpayer for the interest goes on and on. At the end of 100 years it would be $10,500 million; 200 years, $124,200 million. Then you go on for the full life there and that is another story.

That is how simple this whole thing is. When the people of this country realize it, this talk now of ending reclamation—and that is what your argument amounts to—will stop, because they see the tax-

payers of the United States are carrying on benefits to the people, and I do not object to it. I have supported your programs downstream and the people in my State have supported the programs downstream. You cannot blame us for getting a little bit indignant when you begin to base it on your sympathy for us.

Senator O'MAHONEY. Do you not realize that is a justifiable subsidy?

Senator WATKINS. What is that?

Senator O'MAHONEY. This flood-control expenditure in California.

Senator WATKINS. Yes. I voted for it.

Mr. MORRIS. The charts which I showed here indicated that the use of the Collbran formula was, in a 50-year period, just about as expensive as the nonreimbursable. They are just about on a par.

Senator WATKINS. We do not use the Collbran principle. All this money is paid directly into the Treasury, the interest and all. We do not have that interest component or anything of that sort in there. The interest on irrigation money can start much earlier than was indicated in the early report.

The power revenues to be used to pay interest on the principal on irrigation can cut down that so that it would be paid out much sooner.

Mr. MORRIS. The studies which I made had a 16-year period beyond the 40-year normal period. This bill, S. 500, has a 10-pear period.

The power expenditures must be returned 50 years after the work is constructed.

The irrigation expenditures in S. 500 are, first, a 10-year development period, and then 50 years. So that the repayment time for the irrigation project extends for 60 years after the construction period, or 10 years longer than for power, which gives the same opportunity for spending a large amount from power revenues during the latter 10-year period, and produces similar effects to what I have shown in these charts.

Senator WATKINS. I have nothing further.

Senator O'MAHONEY. Senator Kuchel, I suppose you would rather defer until after lunch?

Senator KUCHEL. Yes, sir.

Do you contemplate taking a recess now?

Senator O'MAHONEY. Yes, until 2:30.

The committee will stand in recess until 2:30.

Will you please return, Mr. Morris?

(Whereupon, at 1:15 p. m., the committee recessed until 2:30 p. m. of the same day.)

AFTERNOON SESSION

The hearing was resumed at 2 p. m., upon the expiration of the recess.

Senator O'MAHONEY (presiding). Let us proceed.

Senator KUCHEL. Mr. Chairman, I think in the interest of time I would have no questions now for Mr. Morris, and I would like to introduce the next witness.

Senator O'MAHONEY. Very well.

Senator KUCHEL. I would now like to introduce Mr. Gilmore Tillman, the assistant city attorney for water and power of the city of Los Angeles. Mr. Tillman is an able member of the California bar, and I know will be able to shed some additional light on this question, Mr. Chairman.

STATEMENT OF GILMORE TILLMAN, ASSISTANT CITY ATTORNEY OF THE CITY OF LOS ANGELES, APPEARING AS ATTORNEY FOR THE DEPARTMENT OF WATER AND POWER OF THE CITY OF LOS ANGELES, CALIF.

Mr. TILLMAN. As the Senator has said, my name is Gilmore Tillman, and I appear here as attorney for the department of water and power of the city of Los Angeles.

My testimony will be restricted to a discussion of the proposed storage units and their effect upon those having contracts for power from down stream projects; particularly their effect upon the contracts held by the publicly owned utility which I represent, for delivery of power from Hoover Dam.

Upon this matter we have a very definite position. We believe that the construction of these units and their operation in the manner suggested at these hearings and at the hearings last year concerning S. 1555 would constitute a deliberate violation, by the United States, of obligations due to the holders of contracts for the energy generated at Hoover Dam.

History of power contracts: As the members of the committee undoubtedly know, the Boulder Canyon project was authorized upon a self-liquidating basis. Section 4 (b) of the Boulder Canyon Project Act required that:

> Before any money is appropriated for the construction of said dam or powerplant, or any construction work done or contracted for, the Secretary of the Interior shall make provision for revenues by contract, in accordance with the provisions of this Act, adequate in his judgment to insure payment of all expenses of operation and maintenance of said works incurred by the United States and the repayment, within fifty years from the date of the completion of said works, of all amounts advanced to the fund under subdivision (b) of section 2 for such works, together with interest thereon made reimbursable under this Act.

In order to comply with this section, it was obviously necessary for the Secretary to make a determination as to the amount of power which would be available from the project for sale during the 50-year period specified.

Looking to that end, studies and estimates were made by the Government, from which it appeared that there would be available at the inception of the project, 4,330 million kilowatt-hours of firm energy annually, and that by reason of increasing upstream diversions this quantity would decrease at an average annual rate of 8,760,000 kilowatt-hours. From these studies and estimates of the Government, it appeared that, in addition to this firm energy, there would be water available for the generation of very substantial quantities of secondary energy throughout the 50-year period.

As an extreme illustration, even in the year 1988—the year in which the uses in the upper basin were assumed to be at the maximum for the period involved—it appeared that, assuming the year to be one of average runoff, there would be approximately 2,100,000 acre-feet of water available for the generation of such secondary energy; sufficient for the generation of approximately 900 million kilowatt-hours.

It was upon the basis of these studies and estimates of the Government that the California power contracts were made in 1930 and it

was, of course, these contracts which made possible the construction of the Boulder Canyon project under the law.

From the standpoint of the contractors who agreed to take power these agreements were very firm indeed. Under them, the contractors agreed to take and/or pay for specified quantities of power. More simply stated, this meant that they were bound to pay for the power whether they had any use for it or not. I ask that the committee note carefully that one of the major contractors, Metropolitan Water District of Southern California, paid to the United States approximately $4 million for power which it was unable to take or use.

Senator WATKINS. At that point, would you explain what they did with the power after they took it?

Mr. TILLMAN. They did not take it. Much of it, nothing was done with. It was the obligation of the Secretary of the Interior, oversimplifying it a bit, to do the best he could for Metropolitan in reselling some of it. So some of this was resold at a lower price than the price they were bound to pay. The $4 million loss is net. For some of the power, Metropolitan received nothing and paid in full; for all of it they paid in full, but some of it was resold at a much lower price, and the net out-of-pocket price to Metropolitan Water District of Southern California was almost precisely $4 million, in fulfilling the letter of the contract.

Senator WATKINS. Was that loss to them, or was that what they had to pay for that they did not sell?

Mr. TILLMAN. Well, it was both—no, I beg your pardon.

It was clearly the net.

Senator WATKINS. Did they not make a profit on that which they did use?

Mr. TILLMAN. They have never made a profit. They used power for the pumping of water. They have never sold it in that sense of the word, of the power they did take. Metropolitan was, in effect, not allowed to go into the power selling business. Metropolitan was allotted its quota of Boulder Dam power for the express purpose of pumping with it. In fact, this clearly limited it to that sole use.

But on their behalf, the Secretary of the Interior attempted to sell that which they could not use.

Senator WATKINS. What was the rate they agreed to pay for it?

Mr. TILLMAN. That is a relatively complicated thing. I can state the rates at Boulder. The full energy would be at present 2 mills. Secondary energy would be about a mill.

Senator WATKINS. That was the original price?

Mr. TILLMAN. No, I cannot give you offhand the original price.

Senator WATKINS. It has been reduced since the original price?

Mr. TILLMAN. It has been changed.

Senator WATKINS. Was not the change downward? Did I use the correct word when I said the rate was reduced?

Mr. TILLMAN. I believe so, Senator. I am not certain as to that. I am a relative junior in this matter, having been with the Department only some 16 years. That was before that time. It is a composite rate, and was then.

Senator WATKINS. They sold them at a rate they could afford to take a gamble on when they got it for 2 mills?

Mr. TILLMAN. Senator, I do not know about taking a gamble. The one group that did not take a gamble in this instance was the United States of America.

Our agency signed contracts which, as I say, were very firm indeed, covering a period of 50 years, agreeing to purchase and pay for power, at a time when they did not have a use for it and at a time when it cost Metropolitan out of pocket a net debt loss of $4 million. It looked this loss right in the eye at the beginning of the project. And the agreement was to pay enough money to keep the United States of America whole on the construction, the total construction cost of the Boulder Canyon project. Of course, there is the matter of a $25 million deferment for flood control which is to be paid out of the power rates, not within the first 50 years, but immediately afterward.

Senator WATKINS. What is the total cost of the dam?

Mr. TILLMAN. I think it was made clear that I am an attorney and not an engineer, but my recollection is approximately $126 million.

Senator O'MAHONEY. During what period was this $4 million paid.

Mr. TILLMAN. During the first 5 years, I believe.

Senator O'MAHONEY. And how long ago was that?

Mr. TILLMAN. The project first furnished power during the year 1937–38, and it was during the period following that. After that period, a market developed in southern California which was ample to absorb all the power.

Senator O'MAHONEY. So the situation you describe is that for the first 5 years after the building of this project there was no market for this Hoover Dam power in the Los Angeles area?

Mr. TILLMAN. There was no market at least at a rate in the open market—the Secretary of Interior could not sell it on behalf of Metropolitan at the rate they were required to pay the Government. That much is clear.

Senator O'MAHONEY. And if there were any prophets of gloom and doom in Los Angeles at that time, who were saying, "Why, it is absurd to believe that any power can ever be marketed from the Hoover Dam," they were utterly mistaken in their prophecy, if there were some?

Mr. TILLMAN. Senator, there were some, and they were wrong.

After a beginning period of difficulty, the market in southern California developed to the point where all of the power could be absorbed.

Senator O'MAHONEY. And ever since 1937 it has been sold?

Mr. TILLMAN. No; ever since 5 years after 1937.

Senator O'MAHONEY. Ever since 5 years after 1937 it has been sold?

Mr. TILLMAN. Yes, sir.

Senator O'MAHONEY. There is a market?

Mr. TILLMAN. There is.

Senator O'MAHONEY. And would there not be a market now for the additional power from Glen Canyon, if Glen Canyon were constructed in spite of the present day prophets of gloom and doom?

Mr. TILLMAN. Senator, there would be. Again, now, bear in mind that I am speaking as an attorney, but one associated with the industry.

In my opinion, at a proper price there would be a market in the southern California area for hydroelectric power from any site that was within economic transmission distance on the Colorado River—at a proper price, one which made it advantageous. I say that in the

light of the fact that we, just one entity in that area, are constantly increasing our steam-plant capacity. We have to, to keep ahead of population growth in the area.

Senator O'MAHONEY. And you are constantly growing, constantly expanding, and you find no obstacle that you cannot overcome in the growing; is that not right? There is a wonderful market in Los Angeles?

Mr. TILLMAN. There is certainly a market.

Senator O'MAHONEY. There is a wonderful market. Is it not one of the most marvelous spots in the United States?

Mr. TILLMAN. Senator, I cannot think of an argument against that statement.

Senator O'MAHONEY. And that assumes power?

Mr. TILLMAN. Constantly growing in quantity, Senator.

Senator O'MAHONEY. I think if you were to concede to us of the upper basin one-fifth of the capacity that you fellows in California have shown, you would have nothing to worry about in this bill.

Mr. TILLMAN. If you will allow me to proceed, you will find I am worrying very much about this bill. I find something here very specific to worry about.

Senator O'MAHONEY. I see. Let me call your attention to section 6 of the bill before us, page 11. I will read it to you, and hand it to you.

Mr. TILLMAN. Page 6, did you say?

Senator O'MAHONEY. Page 11, section 6, beginning at line 12. It reads as follows:

> The hydroelectric powerplants authorized by this Act to be constructed, operated, and maintained by the Secretary shall be operated in conjunction with other Federal powerplants, present and potential, so as to produce the greatest practicable amount of power and energy that can be sold at firm power and energy rates, but no exercise of the authority hereby granted shall affect or interfere with the operation of any provision of the Colorado River Compact, the Upper Colorado River Basin Compact, or the Boulder Canyon Project Act.

Those of us who sponsored this bill felt that in that provision we were taking care of all possible market areas and that your area would not suffer. So I would just like to have you have that in mind as you proceed with your paper.

Senator WATKINS. Mr. Chairman, I note that the price of 2 mills was mentioned. Is that for the firm power?

Mr. TILLMAN. Yes, sir.

Senator WATKINS. And the 1 mill is for the secondary power?

Mr. TILLMAN. Both are approximations, of course. And they vary, Senator, from year to year, for this reason: The charge is divided, in effect, into two pieces, one of which is the so-called falling water charge, and the other of which is a charge in effect for the generation, the depreciation on the generators to make the power, replacements, operation, and maintenance, or things of that sort.

Now, as to the price per kilowatt-hour, obviously, since the plants are installed, they have the same replacement cost every year whether we generate a lot of power or a little. So the price goes up and down as total generation goes up and down, and this is by far the worst year of generation in the history of the project. Therefore, the cost per kilowatt-hour this year is, I suppose, without having checked it, but it must be, the greatest in the history of the project proportionately.

This year—I have that here, if you would care to get it literally—the falling water charge is 1.325 mills. That is for firm energy.

Senator WATKINS. What is it for the secondary?

Mr. TILLMAN. It is 0.443 mill.

Senator WATKINS. Less than a half a mill.

Mr. TILLMAN. Forty-four one-hundredths of a mill.

Senator WATKINS. And that secondary power that you get at that rate will be gone if and when this upper basin project is completed?

Mr. TILLMAN. I am coming to that point in a moment.

Senator WATKINS. Is that not right? I am coming to it right now.

Mr. TILLMAN. We think not. We think we will prevent that.

Senator WATKINS. You think you are going to prevent that?

Mr. TILLMAN. Yes.

Senator WATKINS. I am assuming now that if it is constructed, there will be no longer the water belonging to the upper basin, due to its passing through the turbines, the generators, at Boulder.

Mr. TILLMAN. Senator, there is no question of a situation of water belonging to the upper basin, or anything else. Water is allocated to a basin. And we have a contract, bear in mind, Senator, a firm solid contract, with the United States of America. And it is the effect, the impact of this proposal which concerns us.

Senator WATKINS. You think this is going to be violated?

Mr. TILLMAN. Well, I have some comments on it in the course of this paper.

Senator WATKINS. If we violate your contract, you can step into the Court of Claims. But you cannot take away other people's rights.

Mr. TILLMAN. No, sir; Senator, and I hope other people will not take away our rights or attempt to.

Senator WATKINS. I can readily understand that if you are buying power at less than 2 mills for firm power, and you are buying it for less than a half a mill for the secondary power, you would not be interested in seeing anything built upstream where you wanted to get your power for which you had to pay 6 mills.

Mr. TILLMAN. The cost this year of the firm power with the two elements put together is approximately 2¼ mills. There is no secondary this year, so we need not worry about that, but if there had been any secondary, the price I quoted is what we would have paid for it. But there wasn't any.

Senator WATKINS. Shortage of water.

Is not one of the objections of southern California to this project that if they buy the power from Glen Canyon they would have to pay the same as anybody else, somewhere around 6 mills?

Mr. TILLMAN. Senator, I do not know what the rate will be when it is finally established.

Senator WATKINS. Is that not one of your principal objections? Please do not evade.

Mr. TILLMAN. Senator, I am the least evasive of men. I do not, on the other hand, speak for all of southern California. I will put it this way: Never in my presence has any one—high, low, or medium—suggested that as an objection. I have never debated it.

Senator WATKINS. I got the impression this morning that that was one of your objections, that you should not use it.

Mr. TILLMAN. Is that a question to me? I will be delighted to answer it. I didn't intend to.

I have been interested in public power for all my adult life, and I feel just as strongly as Mr. Morris or more so. I object to any high-cost power policy of the Government of the United States, and of our own government of the State of California. I have written the State government condemning proposed legislation in California that embraces that idea of selling public power generated by the public for all the traffic will bear and diverting the money to anything, either to paying for the government of the State or diverting it to buying peanuts or building water projects or anything else. I am by temperament a low-cost public-power man. That is my lifework. And I believe in it. And I believe, as Mr. Morris pointed out in his paper, and as we have argued in your own State—this isn't something we bring to Washington simply because Utah is involved in it—that the idea of a large power company in California attempting to charge its power customers more money than was appropriate to the investment in the cost of producing that power in order to divert that money at these excessive rates to something else is something our regulatory agency would not think of for a minute. That is the law they are bound to enforce in California. Then to think that our Federal Government, in producing a project, should say, as to the power users, "Yes, charge them this much more than is needed to build the power-plant, or to operate it or maintain it, and divert the money to some other very worthy purpose." This is contrary to every concept of public utility ratemaking that I have ever been connected with or have any respect for.

Senator WATKINS. There is nothing immoral in the power users in the upper basin being willing to pay more for the power than you pay downstream.

Mr. TILLMAN. No, sir; there is not.

Senator WATKINS. Then why should you object?

Mr. TILLMAN. Senator, I had no intention of saying anything. You asked me whether I liked it or not. I dislike that principle. But the fact that I dislike it does not mean that every citizen of the upper basin dislikes it. But you asked me my view, and I am giving it to you.

Senator WATKINS. Of course, if you have examined this proposal, you can see that to the upper-basin States it does not make any difference whether you label the charges for water or power. We intend to pay the full bill. But, as I gathered from Mr. Morris' statement, there is pretty strong objection on his part, at least, speaking for southern California, to our power users having to pay part of the bill, when they also use the water, and without the water they could not have the power. The two go together. It does not make much difference to us which way you label it, water and power, or power and water. We understand also now that you folks would like to have some of this power.

And it appears from the arguments made impliedly here that 6 mills is too high, that we cannot pay that up there, and impliedly if you wanted to buy it you could not pay it. I can understand why you do not want to, because you are getting that power now at 2 mills or a little more than that for firm, and for the secondary probably less than a half a mill.

Mr. TILLMAN. No, Senator, approximately a mill.

Senator WATKINS. Well, say a mill. All right. That is so much cheaper, of course, that there is not the slightest comparison.

Mr. TILLMAN. Certainly.

Senator WATKINS. And if you wanted to get that power, and you felt you had to pay 6 mills to get it, you would put in some objections. You would want the Government to fix it so that you could buy the power something like at the price you are now paying. And, of course, we could not develop on that up in our area, and we are willing to pay more, because it costs us that much at least for power developed any other way. And those are our projects up there.

Mr. TILLMAN. Yes, Senator.

Senator WATKINS. They are our resources, and we certainly feel that you are going a long way when you are objecting to the way we run our own business.

Mr. TILLMAN. Senator, you invited my objection.

Senator WATKINS. I did. I wanted to find it out. Because you are here speaking for southern California.

Mr. TILLMAN. Not on that subject. I was speaking strictly for myself. I have a statement, and as I told you I was limited to the storage projects and their impact on our economy.

Senator WATKINS. Getting right down to this, of course, when this project is built there will be no more water coming down there to create secondary power. That is true, is it not?

Mr. TILLMAN. Senator, I don't know. I cannot tell for sure, from the commitments or the statements made, how much water would come down or what the precise program of the Department of the Interior would be. It has been suggested, was suggested at the very hearings here last year, that the upper basin, and therefore apparently through the upper basin, the Secretary of the Interior, owes no obligation to southern California greater than to release at Lee Ferry 75 million acre-feet of water in 10 years.

Now, if you do that, if that be the program—and I do not know what it is, but if that should be the program—and one like it was suggested as I read the hearings; I was not present—if that should be done, we would not only have no secondary. We would have only approximately 74 percent of our firm power.

Senator WATKINS. That is, the firm power you are getting now.

Mr. TILLMAN. The firm, yes. It would wipe out all secondary, and about 26 percent of the firm. Now, whether that is the program of the Secretary, I do not know. The testimony that Mr. Larson, I believe it was, gave here recently indicated that he believed they could go through the filling period without failing to deliver firm energy to the lower basin. But I do not know what the program is, and I do not know whether he felt bound by contract to do it, or just, "We will do it if we can, and if it seems that we cannot and still do other things, we will not do it." I don't know. I cannot answer what water will come down. It is that very uncertainty that I wish to discuss here, because our contract is signed up.

Senator O'MAHONEY. You are here to discuss your contract and what you conceive to be the adverse effects?

Mr. TILLMAN. Yes, sir.

Senator O'MAHONEY. All right. Proceed.

Mr. TILLMAN. I believe we had gotten down as far as the year 1938. And in that year, the United States and the city of Los Angeles entered into a supplemental contract by the terms of which the city bound itself to "take and/or pay for" specified quantities of "secondary" energy, the taking of which had theretofore been entirely optional. Under this contract the city paid some $90,000 for power which it was unable to take or use.

In other words, with respect to suddenly making a firm commitment to take secondary energy, on which we had formerly had only an option, we ran into the same problem that Metropolitan originally had run into with respect to firm power. We had bitten off more than we could chew, so to speak.

Now, in the preamble to this 1938 agreement, the understanding of the parties in 1930 as to firm and secondary energy is explained in the following language:

> * * * recognition was given to the fact that secondary energy cannot be relied upon as being at all times available, but is subject to diminution or temporary exhaustion, while firm energy is the amount of energy agreed upon as being available continuously as required during each year of the contract period * * *.

Continuing the history of these contracts further, in 1941 the Government's estimates as to the firm and secondary energy expected to be available at the Boulder Canyon project formed the basis for new contracts with the California power contractors, including the city of Los Angeles. At this time the estimates of the Government were even more explicit than in earlier years.

As to firm energy, the formula of 4,330 million kilowatt-hours available during the year of the commencement of operations (1937–38), subject to annual diminution of 8,760,000 kilowatt-hours, was reaffirmed.

As to secondary energy, it was assumed that 40 billion kilowatt-hours would be available during the 50-year period ending May 31, 1987. And that assumption is stated in the contract.

It was upon the basis of these estimates—and I will go back clear to the beginning estimates, as well as those at later dates—that the city of Los Angeles entered into a new contract for energy from this project, a contract which fixed rates for firm and secondary energy which were, quite obviously, mutually interdependent. That is, the city's agreement to pay a particular price for the specified quantity of firm energy was based upon the assumption of the parties that, over the period of the contract, the city would receive the specified quantity of 40 billion kilowatt-hours of secondary energy at a specified price.

Upon the faith of these contracts, and the studies and estimates and assumptions of the Government which underlie them, the people of Los Angeles have invested more than $30 million in three transmission lines from the Boulder Canyon project to Los Angeles. The committee should realize that the economic justification for the third of these lines built around 1938, involving some $10 million of public funds of the people of Los Angeles, was absolutely dependent upon the availability of secondary energy.

I realize that $30 million of expenditure is very trivial indeed when compared with the magnitude of the expenditures involved in the

project here, but it is our own, and it was raised self-reliantly at home, locally, to meet a local need. And I am sure that no Member of the Senate of the United States wants to see it casually wiped out, or any part of it, as an expenditure of public money, local public money.

Senator WATKINS. Was there any guaranty of secondary energy?

Mr. TILLMAN. No, sir, and I will reach that in a moment. It was an assumption for ratemaking purposes. And it was quite apparent that you can pay one rate for your firm energy if you are going to get a given quantity of secondary energy—In other words, you get a composite, and if one element of the complementary rate system fails, then you have judged wrongly.

Senator WATKINS. Well, as a matter of fact, the secondary energy for the most part has been just as valuable, has been just as firm, as the firm power, in actual delivery of the power.

Mr. TILLMAN. By no means, Senator.

Senator WATKINS. Most of it?

Mr. TILLMAN. No, Senator.

Senator WATKINS. What does the record show?

Mr. TILLMAN. It shows very, very substantial variations.

Senator WATKINS. You can get that information for us; can you not?

Mr. TILLMAN. I think I have it here, Senator. It varies thus: In 1938–39 for illustration, there was a total of 217 million kilowatt-hours of secondary. In 1952–53, the total was 1,400 million. And there are spots everywhere in between them. And in fact there may have been a lower year than the 217 million kilowatt-hours of 1938–39. I have not tried to get the low point. I am quite sure 1,400 million kilowatt-hours was the high point.

Senator WATKINS. Well, the 1,400 million, up to that point, would be firm power in actual operations?

Mr. TILLMAN. No, sir, quite the contrary. Firm power is that power you rely on to constitute the backbone of your system through thick and thin. And you do not build anything but an emergency replacement in case of a breakdown.

As you can well see, if we needed and could take, as the power contractor altogether did take, 1,400 million kilowatt-hours we unquestionably needed that same amount in the year before, when the release was a billion less. Under those circumstances, you have to build yourself a steam plant to take care of the load in the year in which the billion is not there.

Senator WATKINS. But you do not operate it.

Mr. TILLMAN. But you pay the carrying charge on the capital investment of an enormous sum of money. You do not build a steam plant to replace firm power. That is the point.

The other, or secondary power—oversimplifying it a little—is worth the difference in the cost of fuel oil as compared with the cost of falling water. And something more than that, because to burn fuel to replace secondary you have to hire men and heat up a plant and run it at full operation. I will come to that in a moment.

Now, as to the obligations, or which I conceive to be the obligations of the United States under this last contract, the contract of 1941, I wish to emphasize that I do not contend or even suggest that any of these estimates or assumptions by the Government constitute guarantees. They are necessarily based on two factors which cannot be an-

ticipated with certainty—the actual runoff of the Colorado River and the time of the development of upstream diversions authorized by the Colorado River compact. If, in experience, either of these factors deviates from the original estimate or assumption, and this deviation results in a diminution of secondary, or even firm power, as estimated, we have no ground for complaint. And I carry it that far, Senator, that if the estimates originally made by the Government were wrong and we can't even make our firm power, as we can't this year for some reason, we have no ground for complaint if they misjudged either 1 of those 2 factors.

Senator WATKINS. That is because there was no guarantee?

Mr. TILLMAN. That is correct. It is based on imponderables.

On the other hand, it is equally clear that the United States—here we come to the heart of the matter—has no right, willfully and voluntarily, to divert to some other purpose of its own, water which would otherwise be available for the generation of firm and secondary energy at Hoover Dam.

Upon this ground, as a representative of a public agency threatened with serious injury, I do object to the construction of the storage units proposed in the bill now pending before this committee and their operation in the manner contemplated by the Department of the Interior as evidenced by House Document 364 and by testimony introduced before this committee.

Senator O'MAHONEY. Let me see if you mean that sentence exactly as you have written it.

Mr. TILLMAN. You wish to see whether I do mean it as I wrote it? Yes, Senator.

Senator O'MAHONEY. This is what you wrote:

> On the other hand, it is equally clear that the United States has no right, willfully and voluntarily, to divert to some other purpose of its own, water which would otherwise be available for the generation of firm and secondary energy at Hoover Dam.

Now, by that, do you mean that the United States is barred by these contracts from utilizing any of the water of the Colorado River system in the upper basin States for purposes authorized by the Colorado River compact if that water flowing down could generate firm or secondary energy at Hoover Dam?

Mr. TILLMAN. Certainly not, Senator.

Senator O'MAHONEY. And you will accept that amendment to that statement? Because without that amendment, it has not been what you now acknowledge to be your belief.

Mr. TILLMAN. The consumptive-use projects in the upper basin—I believe it will become perfectly clear as this paper goes on.

Senator O'MAHONEY. Well, I cannot tell who is going to read that and get the wrong impression, you know, an impression which you do not mean to convey.

Mr. TILLMAN. No. If, for illustration, in this next year it was the will of the Congress that sufficient diversion projects should be built in the upper basin to take every acre-foot, which I will not attempt to define, of the maximum total right of the upper basin from the Colorado and use it, I would say that there would be no possible objection on the ground which I make here. You will notice that it is stated "willfully, voluntarily, and for a purpose of its own."

Senator O'MAHONEY. You do say that it is your opinion, freely and voluntarily given to this committee now—and you raise your right hand, sir, in a gesture that I did not ask—for the United States to divert all of the water in the upper basin States for consumptive uses. And you would have no complaint on this ground.

Mr. TILLMAN. Senator, you said all of the water in the upper basin. All of the water to the maximum entitlement of the upper basin under the Colorado River compact.

Senator O'MAHONEY. I will accept that.

Mr. TILLMAN. I think we understand each other, Senator.

Senator O'MAHONEY. That is your position. And you would have no complaint about that at all?

Mr. TILLMAN. Senator, I might complain bitterly about it, but certainly not upon this ground. This ground is restricted. It is a contract matter for cash between the United States and ourselves.

Senator O'MAHONEY. This ground would be untenable.

Mr. TILLMAN. Untenable.

Senator O'MAHONEY. Is there any other ground?

Mr. TILLMAN. I said I restricted myself to this field. I don't wish to embark on a general summary of the upper basin storage project. I think Mr. Ely has a more complete summary than I. Today I can't handle it. I did not prepare it.

Senator O'MAHONEY. May I say it looks at the moment as though you were heading here to say that even though this water, within the maximum rights of the upper basin, were used for consumptive purposes, it nevertheless could not be used while flowing from a higher elevation to a lower elevation to develop power. You bow your head as though you were affirming that.

Mr. TILLMAN. No, I was disavowing it, if I heard you correctly.

Senator O'MAHONEY. That that water could be used for power, for the development of power?

Mr. TILLMAN. Senator, I do not believe I grasped your question. I have lost it. Could I have it read?

(The question referred to was read by the reporter, as above recorded.)

Mr. TILLMAN. I do not understand that question at all. Perhaps I might reaffirm it in my own way. It is crystal clear under the compact and under the contract with the United States, just as I said before, based on an intangible and uncertainty as to how fast the upper basin would develop in its use of its apportioned waters. Now, clearly, within the meaning of that statement which I have made, if the upper basin States themselves simply diverted the water from the stream, which is within their perfect right within their allocation—the several sovereign States made the diversion—obviously, we could not complain to the United States, "You are not sending down enough water for secondary energy." The United States has no water to send down. The upper basin has lawfully taken it away and diverted it and used it. So there would be no problem then at all. And I concede that. You have a perfect right within your entitlement.

Secondly, I concede freely that even though we have a power contract with the United States, the United States may cooperate with the upper basin States and may even finance and build works which do effect these diversions for beneficial consumptive use to the maxi-

mum entitlement of the upper basin. And we have no complaint upon this ground, under our power contracts.

That, I think, is the concession you wish, or the position you wish to get clear; is it not?

Senator O'MAHONEY. That is right.

Mr. TILLMAN. That is my position in that field.

Senator O'MAHONEY. Then what about the use of this same water as it flows from the upper tip of the upper basin down to Lee Ferry, to be used for the development of power.

Mr. TILLMAN. Well, Senator, I believe that will be answered later in my statement. I will note that, and if it is not clearly answered, I will answer it.

Senator O'MAHONEY. You know what I am driving at.

Mr. TILLMAN. I think I do. I will note it so that I will remember.

Senator O'MAHONEY. All right.

Mr. TILLMAN. Shall I proceed, Senator?

Senator O'MAHONEY. You may proceed.

Mr. TILLMAN. As a preliminary, I wish to state directly and bluntly that these storage projects are not required for the development of any irrigation or domestic water-supply project now existing, now authorized, or now proposed for authorization in the bill before this committee.

Senator WATKINS. May I ask you this question now: I understand you are a lawyer, speaking as a lawyer.

Mr. TILLMAN. Yes, sir.

Senator WATKINS. And it seems to me you are now getting way over into the engineering field in making that statement.

Mr. TILLMAN. Yes, sir, I am in that sense of the word. I can be cross-examined as to where the material came from, and I would be happy to answer. In other words, I do not expect you to rely on my word.

Senator WATKINS. This is not your own study?

Mr. TILLMAN. No.

Senator WATKINS. You do not propose to be an expert on that?

Mr. TILLMAN. No, not at all. This is an argument.

Senator WATKINS. You would have the idea that engineering opinion on this would be of more weight than your own opinion?

Mr. TILLMAN. Certainly, sir. Of course.

Senator WATKINS. Just so that we understand.

Mr. TILLMAN. Unquestionably.

Not only are they not required for any irrigation or domestic project that I have mentioned, but they may not be shielded by the mantle, the sacred mantle in fact, of water conservation.

The committee will observe that the two storage units recommended by the Secretary of the Interior will evaporate some 613,000 acre-feet annually.

Senator WATKINS. What is the evaporation from the Hoover Dam?

Mr. TILLMAN. About 650,000 or a little more perhaps.

Senator WATKINS. That is much more wasteful, that reservoir, than it is upstream, is it not?

Mr. TILLMAN. I am not contending that this is a waste of water, Senator, at all.

Senator WATKINS. I say it evaporates a lot more water for the amount stored than these reservoirs upstream.

Mr. TILLMAN. Surprisingly enough, if everybody's estimate is correct, as to what it is at Hoover Dam, Lake Mead, and the upstream projects, which are almost identical in capacity, I would expect normally that with the low elevation and the heat, the differential would be much greater against Hoover Dam. I am surprised it is that close.

Senator WATKINS. As far as the policy is concerned, the building of reservoirs in which there is some evaporation, you are not against that?

Mr. TILLMAN. No, Senator, I am not against it. Please do not misunderstand this to be an attack on the building of dams for the purpose of generating electricity. I consider that to be a very worthwhile purpose.

At any rate, compare this with the estimated stream depletion of the 11 recommended participating projects in the total amount of 401,000 acre-feet annually.

The simple truth is that at present and for the indefinite future, the sole and only useful function of these storage units will be the production of power to be sold, as a revenue-producing commodity, by the United States.

It is in this light, and this light alone, that their relationship to downstream power production and power rights must be judged.

In other words, it is the relationship between the United States with some potential 6-mill power to be sold to 10 public-utility companies for revenue, on the one hand, and the United States with some already developed low-cost power—as we have seen, 2.1-mill power—which is already under contract largely to public agencies, on the other.

And particularly mark this: It is in no degree whatever a clash between water for irrigation in the upper basin as against water for power generation in the lower basin.

Senator WATKINS. You are making an assumption, of course, referring now to your statement up there, which is uncontradicted by the engineers, where you said:

> As a preliminary, I wish to state directly and bluntly that these storage projects are not required for the development of any irrigation or domestic water-supply project now existing, now authorized, or now proposed for authorization in the bill before this committee.

We have had testimony before this committee that this program, including all these storage dams, is absolutely necessary for the upper basin States to get their water and use it for consumptive purposes.

Mr. TILLMAN. Well, Senator, bear in mind, now, what is said here directly. And I am not weasling any at all.

> * * * these storage projects are not required for the development of any irrigation or domestic water-supply project now existing, now authorized, or now proposed for authorization in the bill before this committee.

Senator WATKINS. I just quoted that.

Mr. TILLMAN. No; you just said "to use our water."

Let me hasten to add: This is a limited statement, limited to the uses that you now have and you now propose, formally propose. In order to make full use of what I believe the gentleman said might come in 75 years, to make full use of the water allocated to the upper basin, I say you do need storage. I say you do not need it for any project you have, any project you have under construction, or any project proposed here, of the 11 or 14 or any other participating projects proposed in this bill.

Senator O'MAHONEY. Do you now talk as a lawyer, or as an engineer?

Mr. TILLMAN. I talk as a lawyer who will have to stand cross-examination as to the basis of my opinion and where I got it and how I justify it.

Senator O'MAHONEY. All right. I will follow through, then.

Mr. TILLMAN. I dread the cross-examination, you understand.

Senator O'MAHONEY. Please do not. We are just after the facts.

Mr. TILLMAN. I will face the music.

Senator O'MAHONEY. You say: "I wish to state directly and bluntly * * *." I like a man who is direct and blunt.

Mr. TILLMAN. Thank you, Senator.

Senator O'MAHONEY. Because you can get at his meaning.

"* * * that these storage projects * * *", that is, the storage projects included in the bill——

Mr. TILLMAN. S. 500; yes, sir. And I will make it even more blunt: Neither those storage projects nor any one of them is needed for that purpose.

Senator O'MAHONEY. That was implicit.

*** * * are not required for the development of any irrigation or domestic water supply project now existing, now authorized, or now proposed for authorization in the bill before this committee.**

I take it you would not object if I were to amplify that by saying that it means no project proposed to be constructed for the development of any irrigation or domestic water supply project, in the bill.

Mr. TILLMAN. In the bill; yes, sir.

Senator O'MAHONEY. That is what you mean?

Mr. TILLMAN. Yes.

Senator O'MAHONEY. On what do you base that? How could we irrigate these proposed areas and secure this domestic supply without storing the water which is now being wasted from the upper basin into the lower basin?

Mr. TILLMAN. By the happiest possible coincidence, Senator, that was the next statement I have written down in my written statement. So I will proceed.

Senator O'MAHONEY. I see that here. But it does not seem to explain.

Mr. TILLMAN. You mean how does this work? I will explain the figures, if you wish.

As to the possibility that these storage units are essential for the development of "participating projects" named in S. 500, I believe that the following table fairly states the existing situation:

So item 1 is the consumptive use available without storage, available to the upper basin without storage, 4,300,000.

Senator O'MAHONEY. What is the source of these figures?

Mr. TILLMAN. Well, Senator, that could be done in a great variety of ways; demonstrated from the table of runoff.

Senator O'MAHONEY. Where did you get this?

Mr. TILLMAN. I got this in Washington, within the last 36 hours, far from my office and my normal statistical facilities. And I am fairly familiar with the figure. I assumed that I would be cross-examined about it, and just information or general understanding would do me no good. Happily, this was a subject touched upon by

Mr. Larson of the Reclamation Bureau, who said, at page 6 of his written statement:

> Substantial water development in the upper basin is impossible without the regulation of the uneven flow of the Colorado River. Our studies show that without such control, only about 58 percent of the water apportioned to the upper basin could be used.

Now, there is no question of what he meant by water apportioned to the upper basin, because immediately above he refers to the 7½ million acre-feet. Now, if you take 58 percent, which is all you can use without storage, of 7½ million acre-feet, you come up with a figure of about 4,350,000 acre-feet.

I have, in general, in considering this in Los Angeles, always thought of it as about 4,300,000. So I didn't change my figure, but I simply accepted the Reclamation Bureau's. Or I accepted it, let us say, as an ample buffer for my 4,300,000. That can be demonstrated elsewhere by the run of the river and the downstream obligations in working it up.

Senator O'MAHONEY. By this you mean that 4,300,000 acre-feet can be obtained in the upper basin from direct flow of the stream for the purposes of irrigation and domestic supply?

Mr. TILLMAN. Right. And make good on the downstream obligations and have no storage.

Senator O'MAHONEY. Proceed.

Mr. TILLMAN. Now, the next figure used is existing uses, uses on existing and authorized projects, of 2½ million. Now, as I explain in the text here, that 2½ million is not the present-day use, but it is the contemplated ultimate use under full development of every project now existing, every project now under construction, and every project, if there be such a project, authorized on which no earth has been turned yet. That is what that figure is. That figure, again, is one well known to me and one I have used for all sorts of purposes and have arrived at in various ways from the basic statistics. But for our purposes, for the purposes of this hearing, I rely on Mr. Larson's statement at page 9 of his prepared statement.

Senator O'MAHONEY. What do you mean by authorized projects, since apparently you are not referring to the projects authorized by S. 500?

Mr. TILLMAN. There are many projects under construction, such as Paonia and Eden. I do not profess to know them. But may I read you from Mr. Larson's statement?

Senator O'MAHONEY. Surely.

Mr. TILLMAN. It says that the total consumptive use of water in the upper basin by all constructed projects, those authorized, and projects under construction—constructed, those authorized, and those under construction, you see, is his list—will be approximately 2½ million acre-feet, or one-third of the annual allotment of 7½.

And I think there is total agreement on all these figures among all engineers who studied the matter.

But I want to emphasize that the 2½ million is not now being used but is a use which may not come to its full fruit for 10, 15, or even 20 years.

Senator O'MAHONEY. I assume that you have sought to use uncontroversial figures.

Mr. TILLMAN. That is right, sir.

Senator O'MAHONEY. I merely want to get their origin as you proceed.

Mr. TILLMAN. Where they come from, yes, sir.

Now, the next figure we are interested in, naturally, would be the consumptive use of the participating projects under S. 500, which I have taken at 990,000 acre-feet; on which I may be wrong by a small margin.

If I may explain that, the derivation of that figure is a table, table 1, attached to Mr. Larson's testimony. And in stating the consumptive uses of the various participating projects, they are broken into groups, and the first of these are the 11 so-called initial projects, where Mr. Larson states the stream depletion to be 400,900 acre-feet, which I have taken at 401,000.

Those are, I take it, the recommended projects. I added to that the 3 additional projects, Gooseberry, Navaho, and the San Juan-Chama, which, in Mr. Larson's table, have a stream depletion of 588,900, which I took at 589,000; making my 990,000.

Now, in addition to these 2 groups there is the Eden project, with a stream depletion of 32,400.

Now, the Eden project is called this: Additional participating projects authorized and under construction.

And since Mr. Larson said 2½ million covered all those using water or under construction, I just wrote that 32,400 off.

Thus, that is the derivation of my figures. And if you add the 32,400 acre-feet for Eden back in to my total of 990,000, you would come up with 1,022,000 acre-feet instead of 990,000. But this would be immaterial to my point.

Senator O'MAHONEY. Disregarding that modification and taking your figures as you present them in this table, you show that the consumptive use available without storage is 4,300,000 acre-feet.

Mr. TILLMAN. Yes, sir.

Senator O'MAHONEY. That existing projects and projects authorized, and then those others, together, would require about 3,490,000 acre-feet.

Mr. TILLMAN. Yes, sir.

Senator O'MAHONEY. And that deducting that figure from the total figure set forth under figure 1, there would be a balance of 810,000 feet.

Mr. TILLMAN. Yes, Senator.

Senator O'MAHONEY. Now, how would that water be placed upon this land for consumptive use?

Mr. TILLMAN. Well, now I am going to run for the engineers. I cannot answer that directly, because I do not know, but I would say it would be put on the land in precisely the way it is proposed to be under S. 500.

In other words, I am sure the Senator understands that no water from Glen Canyon is going to be diverted from Glen Canyon on to any of these participating projects. This will not be the normal upstream storage reservoir above an irrigation project.

Senator O'MAHONEY. The bill does not propose that water shall flow uphill.

Mr. TILLMAN. No.

Senator O'MAHONEY. No. We are in agreement on that.

Mr. TILLMAN. So whether the storage reservoirs are built does not in any way affect how the water is to be put on the land. I can only say the water will be put on the land exactly the way they would have done it otherwise.

Senator O'MAHONEY. Then so far as your paragraph on page 5 is concerned, I would like to have you interpret for me the meaning of the word "development" that you are using:

> As a preliminary, I wish to state directly and bluntly that these storage projects are not required for the development of any irrigation or domestic water supply project.

Development in what sense?

Mr. TILLMAN. Senator, probably to get my position beyond retreat, I mean, as a solid way to state it, that the stream depletion in the upper basin to the extent of 4,300,000—in other words, the streams may be depleted to that extent. That is what I mean by "develop"—develop to use that much water.

Senator O'MAHONEY. Do you want this committee to believe that you believe that water can be somehow or other made available for distribution to these projects which you have mentioned without the construction of any storage reservoir?

Mr. TILLMAN. Yes, sir. Certainly, sir.

Senator O'MAHONEY. Absolutely and completely, without any storage reservoir?

Mr. TILLMAN. Senator, I am just quoting Mr. Larson. Yes. And I do believe him wholly. I agree with him, in other words; with much less ability and authority.

Senator O'MAHONEY. I note that you say nothing about cost.

Mr. TILLMAN. They are not involved in the cost.

Senator O'MAHONEY. Could the water be developed, as you use the word, for irrigation and domestic water supply in a growing country, assuming that it were to grow, without storage, at a cost that could be repaid by the settlers?

Mr. TILLMAN. I am informed by the Reclamation Bureau that something like 12 percent is all the irrigators can repay. I am rounding it off.

Senator O'MAHONEY. So the offer that you are making to the settlers on these projects in the upper basin States is that they can use their water on these lands but cannot possibly pay for the water. You accept Mr. Larson on that, do you not?

Mr. TILLMAN. That they cannot pay for it? Oh, yes. They cannot pay for it. I accept him on that, too. I have been on about two of these projects and never have seen the others.

Senator O'MAHONEY. Then you tell us that the storage projects should not be built even to help pay for the distribution of the water upon these projects, merely because of these contracts of which you speak; because of your belief that to build the storage projects would prevent the delivery of water necessary to develop the power which your group has contracted to pay for?

Mr. TILLMAN. Senator, I have not yet been able to reach my conclusions. I have never said the thing you paraphrased, that these have not been built. I have not said that at all yet.

I have a conclusion in that respect which I would like to state precisely. But as to the rest of it, obviously the project can be built. It is largely a matter of subsidy.

Senator O'MAHONEY. We are in agreement as far as we have come.

Mr. TILLMAN. The fact that they cannot pay for the project does not mean the only alternative is that there should be a power project to pay for it. If the United States decides to build it and turn it over, I cannot stop that. That is one alternative.

Senator O'MAHONEY. On the basis of what you have said, do you mean that these storage projects would necessarily prevent the United States from fulfilling the contract which you have mentioned?

Mr. TILLMAN. Well, Senator, I think I would like to state that in the language which I have considered rather carefully and written out. I will reach that shortly.

Senator O'MAHONEY. Very well.

Mr. TILLMAN. We now come to the question of the damage to the downstream power contractors. And I will make the comment that I made in the written paper, that the margin of safety demonstrated by the tabulations speaks for itself, the 810,000 margin.

(The unread paraphrased portion of Mr. Tillman's prepared statement follows:)

As to the possibility that these storage units are essential for the development of the "participating projects" named in S. 500, I believe that the following table fairly states the existing situation.

		Acre-feet
1. Consumptive use available without storage		4,300,000
2. Existing and authorized projects	2,500,000	
3. S. 500 participating projects	990,000	
		3,490,000
4. Consumptive use available without storage, balance		810,000

As to item 1 of this tabulation, I believe that it might well be set somewhat higher, but I know of no contention that it should be less.

Item 2 does not represent present use. On the contrary, it includes the ultimate use, after full development, covering all projects either existing or authorized. Necessarily, this full development will not be reached for some years.

The margin of safety demonstrated by the tabulation speaks for itself, and I shall not labor the point.

Now, I have spoken of damage to the holders of contracts for power at Hoover Dam. Actually, the damage and the attendant expense is imposed upon the retail electric consumers who are served with energy generated at Hoover Dam. In the case of the city of Los Angeles this means a direct charge upon more than 800,000 electric customers of the city, who, in turn, are the heads of families or represent the full 2 million people of the city of Los Angeles. We serve all of them.

Senator O'MAHONEY. To what do you refer by "damage"?

Mr. TILLMAN. I will reach the "damage" immediately.

Senator O'MAHONEY. You say, "I have spoken of damage"——

Mr. TILLMAN. I have said what the United States could not do.

Senator WATKINS. How much do they have to pay? What is the rate for the power used by these people in Los Angeles?

Mr. TILLMAN. It is a very complex sliding-scale rate, a regressive rate; the more you use, the less you pay. I can get you a ratebook.

Senator WATKINS. If you are telling us about damage, we ought to see what they are being required to pay.

Mr. TILLMAN. Senator, I assure you of this, that what in a given instance they are required to pay in itself, standing alone, demonstrates nothing. We have very low rates as compared with areas which have for illustration no access to free cooling water for their steam plants, and no hydro plants. Our rates seem incredibly low. Equally, our rates are very high and our rate to the Government, which I am sure you consider very low, is probably quite high, as compared with Tennessee Valley rates or rates in the Northwest. And there are places in various States which I will not mention where they are very high.

What we charge is a rate which is the lowest rate on which we can get by without any thought of a profit and still keep our system going, and which is determined by: What do we have to pay for our power?

Senator WATKINS. As a practical matter, you live in Los Angeles, do you?

Mr. TILLMAN. Yes, sir.

Senator WATKINS. You have a home?

Mr. TILLMAN. Yes, sir.

Senator WATKINS. What do you pay for power? What is your rate?

Mr. TILLMAN. I couldn't give you the scale, Senator. We have books here. I am not a rate expert.

Senator WATKINS. Do you not pay the bills? Or does your wife pay the bills?

Mr. TILLMAN. No, I pay them. But I trust the Department. I pay the total that shows on the bill. But I know the rates and am quite familiar with them. We have various kinds of rates, a domestic rate, commercial, lighting, industrial power, various sorts of rates. You are getting into a very complex field.

Senator WATKINS. Can you furnish this committee with a rate schedule? I want to see just how badly these people are hurt.

Mr. TILLMAN. Yes, sir, possibly this afternoon.

Senator WATKINS. I would like to have it.

Mr. TILLMAN. I hope to demonstrate it to you.

Senator WATKINS. If you have them now, why do you not give them to us?

Mr. TILLMAN. I don't have them here.

Senator WATKINS. I thought you said you were going to demonstrate.

Mr. TILLMAN. I demonstrated the amount of damage. It will go up that much. That is the effect of the story I am telling.

Senator WATKINS. I can anticipate that if we take our water out of there and you are not able to use it for anything any more, you are bound to have your rates go up, but I do not see that that is any damage to you.

Mr. TILLMAN. No, it isn't. As I explained, if the State of Utah proceeds to divert in any manner she chooses for consumptive use all the water to which she is entitled, of course there is no damage.

Senator WATKINS. You do not expect us to divert any part of that for power purposes, do you? We are talking about diversions now. That means taking the water out of the river. You do not expect us to divert for any power purposes. There is nothing in this program that indicates that.

Mr. TILLMAN. As to whether the State of Utah will do it?

Senator WATKINS. Or the State of Idaho.

Mr. TILLMAN. You mean as compared with the Federal Government? There is great evidence that the United States intends to do it. That is what all this is about. That is the only part of the project I am objecting to.

Senator WATKINS. You have seen this program. You must have read this bill and must have studied the report somewhat to know what the project is all about. Where is the diversion? For power purposes?

Mr. TILLMAN. That will become clear.

Senator O'MAHONEY. Senator, he does not object to diversion. Am I not right?

Mr. TILLMAN. That is right.

Senator O'MAHONEY. You do not object to any consumptive use?

Mr. TILLMAN. That is right.

Senator O'MAHONEY. All you object to is storage.

Mr. TILLMAN. That is right.

Senator WATKINS. He objects to diversion for power purposes.

Senator O'MAHONEY. He is allowing us to have the great advantage of building these 11 projects, the participating projects, without storage, which is a nice trick if you can do it.

Mr. TILLMAN. And everyone has agreed you can do it. Do you not rely on Mr. Larson? He just finished telling you that.

Senator O'MAHONEY. No, I do not see that. But I do not want to interrupt you.

Senator WATKINS. As to those nine dams or whatever there are on the main stream there, can you name any one of them where we divert any water from that river for power purposes?

Mr. TILLMAN. Divert it offstream? No.

Senator WATKINS. You were talking about diversion. Diversion means to take it out of the stream. We leave it in the stream. All we do is, when it comes tumbling down from the top of the dam to the bottom, we take the power out as it goes down. That is what you are objecting to.

Mr. TILLMAN. Senator, I assure you that the term "diversion to storage" is a very common phrase in the field, and that is the sense in which I meant it, diverting it from the stream to storage. That is a common phrase, and that is what I meant.

I would like, if I may, to finish the text. I would be glad to be stopped, of course, for any information which appears to be missing.

Senator O'MAHONEY. All right.

Mr. TILLMAN. The city department which I represent is, of course, a nonprofit organization and has no source of revenue other than payments by its customers for service rendered. Therefore, every increase in cost of power purchased by the city must be passed along in the form of increased rates to its customers.

Unfortunately, the figures involved in any analysis of the electric-generation costs of a public utility are usually either so large, billions of kilowatt-hours; tens of millions of acre-feet of water, or so small, mills or fractions of mills per kilowatt-hour, as to seem to have no actual relationship to real individual people. In the course of operation, however, all these figures, large and small, are ultimately re-

duced to simple, direct, and readily understandable figures in dollars and cents on the individual customer's bill.

Senator WATKINS. And that is precisely what I am asking you for.

Mr. TILLMAN. Yes, Senator, and you shall have our rate schedule.

It is in this light that I wish to explain the stake that our customers, the people of Los Angeles, have in "secondary" energy in Hoover Dam.

Our contract contemplates that a total—and in the text of the written statement is written "800,000 kilowatt-hours," but it should be "800 million"—of 800 million kilowatt-hours of such energy will be available at Hoover Dam in a year of average runoff.

Of this, the city of Los Angeles is by contract entitled to 55 percent or 440 million kilowatt-hours. House Document 364, as well as testimony at various hearings concerning upper basin storage, makes it abundantly clear that if the storage units proposed in S. 500 are built, the Department of Interior intends to divert to this storage, during the "filling period," all water which would otherwise be available for secondary generation.

In an average year, the water thus diverted to storage necessarily will be replaced—and that is my "diversion to storage" again, Senator—by 760,000 barrels of fuel oil. At a price of $1.80 per barrel, the oil thus substituted for falling water would cost $1,365,000.

As to the price of oil, I may say that since the war we have paid prices ranging from $2.50 a barrel down to about $1.10.

On this basis, the net increase in cost to our customers for the production of power for this item alone—cost of fuel oil versus falling water charge—would be approximately $1,185,000.

In addition, of course, there would be a substantial labor expense for the operation of our fuel-burning plants; an expense greatly in excess of the generation charges otherwise payable at Hoover Dam.

Again, our 3 transmission lines, involving an investment of more than $30 million, would be reduced in load factor far below the level contemplated when the investment was made in good faith. Since, in a normal year "secondary" energy constitutes more than one-third of the total energy taken by our system from Hoover Dam, the magnitude of the drop in load on these lines is apparent.

The committee must also remember that the system of the city of Los Angeles represents only a part of the customers now entitled to receive secondary energy from Hoover Dam. The total net extra cost for replacement fuel for all secondary energy would be, in a normal year, approximately $2,152,000.

I wish to emphasize that none of the figures which I have cited are theoretical or merely statistical in character. On the contrary, they represent things that are very tangible indeed. The 760,000 barrels of fuel oil is real oil to be purchased from real oil companies. The 1,200,000 of extra cost must be paid in real money by our individual customers.

In the case of "firm" energy, any diversion to storage of water necessary for the generation of the full amount contemplated by the contract is even more obviously a breach of obligations since, by formal contract, it has heretofore been recognized by the United States that "firm energy is the amount of energy agreed upon as being available continuously as required during each year of the contract period."

I might state that that language does not appear in our 1941 contract, but the contract covers precisely the same energy, the same firm energy, in the same quantities.

For each kilowatt-hour, or million kilowatt-hours, of firm energy withheld, the financial burden upon our customers would be even greater than in the case of secondary energy, for they would not only be required to pay for fuel oil and operating labor, but also bear the capital costs of building fuel-burning plants.

In conclusion, I simply point out that, in order to fulfill its obligations and maintain the integrity of its existing contracts, the United States must:

(1) Deliver at Hoover Dam, for the generation of firm and secondary energy, the full run of the river, less all upstream diversions for domestic and agricultural purposes, or

(2) During the filling period of the proposed storage units, deliver to the Hoover Dam power contractors, at the applicable contract firm or secondary rate, energy which in quantity and in time and place of delivery is equivalent to that which would have been generated at Hoover Dam had no water been diverted to this upstream storage, or

(3) During the filling period of the proposed storage units, make full financial reparation to the Hoover Dam power contractors for the costs to them (including capital costs, where appropriate) of the replacement of all firm or secondary energy which would have been generated at Hoover Dam had no water been diverted to this upstream storage.

All economic studies of these storage units have contemplated sale of the total power output at 6 mills with no provision for reparation for damage caused to the holders of downstream contracts. I believe that this is clearly erroneous and, if they are to be built, their economic value must be judged after charging them with the fulfillment, in the manner suggested as alternative (2) or (3) above, of the obligations of the United States to downstream contractors.

Thank you.

Senator O'MAHONEY. Mr. Tillman, I enjoyed your testimony.

Mr. TILLMAN. I enjoyed giving it, Senator.

Senator O'MAHONEY. You are very clear and very blunt and specific in what you intend.

Mr. TILLMAN. Yes, sir.

Senator O'MAHONEY. Nobody need be in any doubt as to what you have in mind.

I want to ask you if you have taken into consideration the importance which the Engineers have placed upon the stabilization of the flow of the river.

Mr. TILLMAN. Certainly, sir.

Senator O'MAHONEY. And do you realize, or have you taken into consideration—I am sure you realize it—that this stabilization can be secured only by storage?

Mr. TILLMAN. I do.

Senator O'MAHONEY. No question about that?

Mr. TILLMAN. That is right, Senator; for the long run. I am just paraphrasing Mr. Larson. As he has it, up to 4,300,000 acre-feet—and this bill would bring uses up to only about 3,490,000 acre-feet—of diversions for consumptive use in the basin may be made safely

without any storage at all. To go beyond that, you are going to need storage. Let us suppose that in 30 or 40 or 20 years you want to go beyond 4,300,000—then, I yield—the authorization and construction of some of these storage units at such future time, might be indispensable.

Senator O'MAHONEY. Of course, we do not quite agree on that point.

Mr. TILLMAN. On which point?

Senator O'MAHONEY. The point you just made. The storage that is stabilization is absolutely essential to allow the exchange of water whereby the deliveries required by the lower basin can be made and at the same time the upper basin developed.

I think so many people, in reading about this project, think of the river as a static thing.

Mr. TILLMAN. I am not one of those.

Senator O'MAHONEY. I know you are not. But realizing that you are not, you know that in order to prevent the terrific wastage of water which has created a desert out of this area, and at the same time preserve the uses which are being developed through the assistance of the Government of the United States, it is necessary to build storage projects.

Mr. TILLMAN. Senator, I have observed that you are a man who likes precision of statement and who understands thoroughly the difference between a bland generality and a statement of precision. If you will examine the statements before this committee or other committees or reports of any kind, you will find—and I charge this to the reclamation service reluctantly—bland generalities, such as one I read to you, "storage is necessary for any substantial development in the upper basin, because you can only develop 58 percent without it."

Well, I grant that. But the implication is that 58 percent is nothing. Just translate that 58 percent. You can do it. Translate the run of the river. Every statistic that is developed, every precise statement you can reach, you will find to your own observation to be directly in conflict with the casual generalities.

"The upper basin is going to require this storage." And "reservoirs will be easier to fill now"—all these generalities may be true, but if you will bear down on Mr. Larson as explicitly as you have borne down on me, I think he will probably give you just about the same answers I have. I think so.

Senator O'MAHONEY. You present the picture that while storage has been of tremendous benefit to the lower basin and particularly to California, it is a high crime and misdemeanor so far as the upper basin is concerned.

Mr. TILLMAN. Not at all, Senator.

Let me put it this way. We are in this position. I will use an illustration. If someone wanted to widen a street which fronted some property which I own, and they were going to take the front 10 feet off my property and make a nice, wide street, I would probably be confronted with two things. First, it is a detriment to me to take away 10 feet of my property, and they will have to pay me for it. Second, if they make it a nice, wide street, I will probably have to pay something. I did not assert in here that you should not build the project. I may not know the economics of this but the

charges they are suggesting for cost of production and sale of power do not look good to me, as a lawyer. It may be sensible for the United States to put in these big storage dams and get 2 power drops instead of 1 out of a single acre-foot of water. But the fact that it is perhaps good economy for the United States to do it doesn't mean that they shall do it at the expense of our customers, at the expense of our contracts. Normally, a man who says, "Well, I must destroy one thing in order to make a bigger and a better one," pays for the one destroyed.

Senator O'MAHONEY. You make your story pretty clear, and I want to help you make it clear.

Mr. TILLMAN. I worry about the look in your eye, there, Senator.

Senator O'MAHONEY. You divert my approach by your very casual responses to me.

What I am driving at now is that as I understand your testimony, it amounts only to a contention not that you object to the storage of water per se, not that you object to the development of power per se; right?

Mr. TILLMAN. You are totally correct, Senator.

Senator O'MAHONEY. You have no objection whatsoever to the sort of subsidy that was given to the Central Valley of California, to be given to some other area of the United States, through the development of power. You are not concerned about that.

Mr. TILLMAN. Nothing which was in my statement today was aimed at anything of that sort. That is correct. I will not broaden on my personal general views on this. I think we have had enough.

Senator O'MAHONEY. And you would not be concerned at all about the fact that there is a bill now pending before the Senate of the United States which provides for the use of some power—I don't know how much—to the Southern California Electric for the development of the Ventura project; that is Hoover power.

Mr. TILLMAN. I cannot answer on that. I certainly didn't object here.

Senator O'MAHONEY. On the ground of power; yes. So that all in the world you are trying to do is to say that there would be a lawsuit against the Government of the United States if it dared to authorize by legislation of Congress the storage of water in the upper basin, which you contend would deprive the purchasers of power in the area you represent of the Hoover Dam?

Mr. TILLMAN. As I told you I prepared my statement here in Washington in some haste, and I may have left it with a rather weakly stated conclusion. I explained what the United States should do—the only honorable alternative I could see, considering the nature of the downstream contracts.

Now, instead of saying that the only thing in the world that I have said is that if you do this to us there is going to be a lawsuit—on the contrary, Senator, I am testifying before a committee of the Congress of the United States, which has power to act. And in this field, if our case is true, I feel that very definitely the Congress of the United States should add to any bill that ever authorized these storage projects a definite set of directions to the Secretary of the Interior of the United States to avoid litigation, and instructions as to what he shall do, what the honorable thing and the moral thing to do is.

Senator O'MAHONEY. I have those in mind. Those are all contingent upon your contention that there is a lawsuit here, and watch out.

Mr. TILLMAN. Fair treatment, Senator. Fair treatment is what I ask. Morality. I would waive the question if there were no legal right at all and say that under these circumstances there is a moral right the Congress should enforce.

Senator O'MAHONEY. You and I as lawyers know that litigation over contracts always arises through a misunderstanding of the terms by people on both sides who believe or allege to believe that they are not treated fairly. You will agree to that?

Mr. TILLMAN. That is true, Senator, I do agree.

Senator O'MAHONEY. So I want to call your attention here to section 6 of the Senate bill 500. And I recite this section again, because it seems to me that it states clearly the purpose of Congress:

> The hydroelectric powerplants authorized by this act to be constructed, operated, and maintained by the Secretary shall be operated in conjunction with other Federal powerplants, present and potential, so as to produce the greatest practicable amount of power and energy that can be sold at firm power energy rates, but no exercise of the authority hereby granted shall affect or interfere with the operation of any provision of the Colorado River Compact or the Upper Colorado River Basin Compact or the Boulder Canyon Project Act.

It seems to me that that was the situation, and even protected your clients if they can show any damage.

Mr. TILLMAN. Oh, no, Senator. It does not. In other words, we claim our damage arises—I want this to be clear—and our right arises, as a power contractor now, and not as part of the lower basin demanding power for irrigation or domestic use. Our claim arises under our right for power and has nothing to do in that sense of the word with damage under the compact.

Senator O'MAHONEY. Of course, you are a power contractor of a particular kind.

Mr. TILLMAN. Yes, sir; that is correct.

Senator O'MAHONEY. That is, a power contractor under the Boulder Canyon Act.

Mr. TILLMAN. That is right.

Senator O'MAHONEY. And therefore this section I have just read refers to it. Whatever powers you have, whatever rights you have, under that contract are rights that have arisen from the Boulder Canyon Act.

Now, I want to conclude by quoting to you the testimony of Mr. Howard, the general counsel for the Metropolitan District this morning. I am quoting from page 11 of his statement:

> The Metropolitan Water District cannot acquiesce in the enactment of congressional legislation predicated upon false assumptions with respect to the availability of water for use in the upper basin—

You see, he is attacking your assumptions as well as Mr. Larson's—

> those assumptions of availability being predicated upon a compact twisted out of shape by interpretations unheard of at the time the obligations of parties to the compact were assumed.

Senator WATKINS. Mr. Chairman, I have a question.

Senator O'MAHONEY. Senator Watkins.

Senator WATKINS. Do you have copies of these contracts you claim are going to be violated?

Mr. TILLMAN. Senator, they are all published in several fashions. One is a compilation by the Department of the Interior and another is a compilation entitled "Wilbur and Ely, the Hoover Dam Documents" (H. Doc. No. 717, 80th Cong., 1948), and they are published at length. I do not have them with me.

Senator WATKINS. This last contract on power, you say, the new one that was entered into, that is published, too?

Mr. TILLMAN. Oh, yes. You will find it in any compilation of documents. And there is a relatively new one from the Department of the Interior.

Senator WATKINS. And I ask you again, it is your construction of that contract that the United States guarantees so much power?

Mr. TILLMAN. Oh, no, Senator.

Senator WATKINS. If they did not guarantee it, I do not see how they are hurt.

Mr. TILLMAN. That was not my contention. As I explained, estimates of power were made and they were subject to defeat, either totally or in part, by the run of the river being lower than estimated, which obviously was uncertain, and the men who made the estimates always had to assume that power gradually diminishes as upstream diversions take away water.

Senator WATKINS. That was an assumption?

Mr. TILLMAN. Yes; that was an assumption. And if either of those go wrong, we have no complaint at all. But here there is contemplated deliberate diversion to storage not required by either of those things, either low water or use in the upper basin for domestic or irrigation purposes.

Senator WATKINS. But have you taken into consideration the life of Boulder or Hoover Dam will be extended about 200 years by reason of the building of these projects?

Mr. TILLMAN. Senator, I have not attempted to evaluate the benefits, if any, to the Hoover Dam contractors from the building of any of these upstream projects. We seem to have trouble enough getting our benefits when they are in a written contract form. Regarding the vague idea, which I may refer to as "pie in the sky," that it is going to be so nice when these storage units are put in—"you are going to get a great deal of good from them downtsream," if we are going to have good done for us, particularly as contractors, we are entitled to have a contract setting this "good" forth so as to know where we stand.

Senator WATKINS. Is it your contention that the contracts you have entered into for the city of Los Angeles with respect to the power are rights over and above anything contained in the compact?

Mr. TILLMAN. Oh, no, Senator. They must be strictly within it. Of course, they are.

Senator WATKINS. I got the contrary impression from what you said. I am not going back, but as it was read, it seemed to me you took a contrary position.

The rights you are talking about do not grow out of the compact but grow out of these contracts between the United States, the Bureau of Reclamation, and the city of Los Angeles.

Mr. TILLMAN. But which contracts in every respect are made subordinate to the compact. They are within it. In other words, the

compact gives me, as a citizen, no right whatever to water. It is given to the lower basin as an area. And I cannot sue the United States for my share of the water. But if I have made a contract with the United States, I would say my right arose under that contract. And that is what I mean here. The contract, in turn, must be subordinated to and consistent with the compact, but my right arises directly from the contract.

Senator WATKINS. And if the lower basin compact is construed as we contend it should be construed, and breached, there would not be any damage resulting to you? We construe it to mean that we can use the water for electricity. We cannot take it away from the river and use it for electricity, but we certainly can use it as it goes down the canyon.

Mr. TILLMAN. I accept that as your view of the matter, Senator, of course.

Senator O'MAHONEY. Senator Millikin?

Senator MILLIKIN. I would like to ask: What is the matter with the Senator's thesis that he has just explained?

Mr. TILLMAN. Well, Senator, that involves a very fundamental question.

Senator MILLIKIN. I think I am capable of understanding it, if you would explain it.

Mr. TILLMAN. I would have to go back over some of this, I mean. I would be very happy to. I am not sure how much of the testimony you heard.

Senator MILLIKIN. I just came in a little bit ago.

State your proposition, will you, Senator?

Senator WATKINS. Perhaps it had better be read.

(The reporter read the foregoing questions and answers.)

Mr. TILLMAN. I can make one short literal answer to that, and that is that as stated we can use the water to generate the power as it runs down the river. I would agree wholly with that, because that is in effect a run of the river plant with no storage, where you put in a powerplant and use the water as it runs down. The issue in dispute here is not your right to generate power as it runs down the river, but the right to intercept water, for the United States to intercept water and put it to storage for ultimate use for generation of power, instead of, as we contend, the obligation to send it down, at the time it arises, to Lake Mead for the generation of energy at Lake Mead.

Putting of powerplants in the stream, of course, we have no objection to. They can put as many as they choose.

Senator MILLIKIN. I think I understand now.

Senator O'MAHONEY. Thank you very much, Mr. Tillman.

Mr. TILLMAN. Thank you, Senator.

Do you still wish for the record a copy of our rate schedule, Senator?

Senator WATKINS. Certainly. I want to see how bad you are hurt.

Senator O'MAHONEY. Senator Watkins, with your acquiescence, I would think it would be well to suggest that the rate itself would not be very useful unless you should provide for us the average rate for all power delivered in 1 year.

Mr. TILLMAN. We can get such a figure and would be very happy to, Senator.

Senator O'MAHONEY. Thank you.

The committee will recess until 10 o'clock tomorrow morning.

(Whereupon, at 4:50 p. m., the hearing was recessed until 10 a. m. Friday, March 4, 1955.)

(The full text of Mr. Tillman's prepared statement is as follows:)

My name is Gilmore Tillman. I am assistant city attorney of the city of Los Angeles and I appear here as attorney for the Department of Water and Power of the city of Los Angeles.

My testimony will be restricted to a discussion of the proposed storage units and their effect upon those having contracts for power from downstream projects; particularly their effect upon the contracts held by the publicly owned utility which I represent, for delivery of power from Hoover Dam.

Upon this matter we have a very definite position. We believe that the construction of these units and their operation in the manner suggested at these hearings and at the hearings last year concerning S. 1555 would constitute a deliberate violation, by the United States, of obligations due to the holders of contracts for the energy generated at Hoover Dam.

HISTORY OF POWER CONTRACTS

As the members of the committee undoubtedly know, the Boulder Canyon project was authorized upon a self-liquidating basis. Section 4 (b) of the Boulder Canyon Project Act required that:

"Before any money is appropriated for the construction of said dam or power-plant, or any construction work done or contracted for, the Secretary of the Interior shall make provision for revenues by contract, in accordance with the provisions of this act, adequate in his judgment to insure payment of all expenses of operation and maintenance of said works incurred by the United States and the repayment, within 50 years from the date of the completion of said works, of all amounts advanced to the fund under subdivision (b) of section 2 for such works, together with interest thereon made reimbursable under this act."

In order to comply with this section, it was obviously necessary for the Secretary to make a determination as to the amount of power which would be available from the project for sale during the 50-year period specified.

Studies and estimates were made by the Government, from which it appeared that there would be available at the inception of the project 4,330 million kilowatt-hour of firm energy annually, and that by reason of increasing upstream diversions this quantity would decrease at an annual rate of 8,760,000 kilowatt-hour. From these studies and estimates of the Government, it appeared that, in addition to this firm energy, there would be water available for the generation of very substantial quantities of secondary energy throughout the 50-year period. As an extreme illustration, even in the year 1988 (the year in which uses in the upper basin were assumed to be at the maximum for the period involved) it appeared that, assuming the year to be one of average runoff, there would be approximately 2,100,000 acre-feet of water available for the generation of such secondary energy; sufficient for the generation of approximately 900 million kilowatt-hours.

It was upon the basis of these studies and estimates of the Government that the California power contracts were made in 1930 and it was, of course, these contracts which made possible the construction of the Boulder Canyon project.

From the standpoint of the contractors who agreed to take power these agreements were very firm indeed. Under them, the contractors agreed to "take and/or pay for" specified quantities of power. More simply stated, this meant that they were bound to pay for the power whether they had any use for it or not. I ask that the committee note carefully that one of the major contractors (Metropolitan Water District of Southern California) paid to the United States approximately $4 million for power which it was unable to take or use.

In 1938 the United States and the city of Los Angeles entered into a supplemental contract by the terms of which the city bound itself to "take and/or pay for" specified quantities of secondary energy, the taking of which had theretofore been entirely optional. Under this contract the city paid some $90,000 for power which it was unable to take or use.

In the preamble to this 1938 agreement, the understanding of the parties in 1930 as to firm and secondary energy is explained in the following language:

"* * * recognition was given to the fact that secondary energy cannot be relied upon as being at all times available, but is subject to diminution or tem-

porary exhaustion, while firm energy is the amount of energy agreed upon as being available continuously as required during each year of the contract period * * *"

In 1941 the Government's estimates as to the firm and secondary energy expected to be available at the Boulder Canyon project formed the basis for new contracts with the California power contractors, including the city of Los Angeles. At this time the estimates of the Government where even more explicit than in earlier years.

As to firm energy, the formula of 4,330 million kilowatt-hours available during the year of the commencement of operations (1937–38), subject to annual diminution of 8,760,000 kilowatt-hours, was reaffirmed.

As to secondary energy, it was assumed that 40 billion kilowatt-hours would be available during the 50-year period ending May 31, 1987.

It was upon the basis of these estimates and assumptions that the city of Los Angeles entered into a new contract for energy from this project; a contract which fixed rates for firm and secondary energy which were, quite obviously, mutually interdependent. That is, the city's agreement to pay a particular price for the specified quantity of firm energy was based upon the assumption of the parties that, over the period of the contract, it would receive a specified share of 40 billion kilowatt-hours of secondary energy at a specified price.

Upon the faith of these contracts, and the studies and estimates and assumptions of the Government which underlie them, the people of Los Angeles have invested more than $30 million in 3 transmission lines from the Boulder Canyon project to Los Angeles. The committee should realize that the economic justification for the third of these lines, involving some $10 million of public funds of the people of Los Angeles, was absolutely dependent upon the availability of secondary energy.

OBLIGATIONS OF THE UNITED STATES

I wish to emphasize that I do not contend or even suggest that any of these estimates or assumptions by the Government constitute guaranties. They are necessarily based on two factors which cannot be anticipated with certainty—the actual runoff of the Colorado River and the time of the development of upstream diversions authorized by the Colorado River compact. If, in experience, either of these factors deviates from the original estimate or assumption, and this deviation results in a diminution of secondary, or even firm power, as estimated, we have no ground for complaint.

On the other hand, it is equally clear that the United States has no right willfully and voluntarily to divert to some other purpose of its own, water which would otherwise be available for the generation of firm and secondary energy at Hoover Dam.

Upon this ground, as a representative of a public agency threatened with serious injury, I object to the construction of the storage units proposed in the bill now pending before this committee and their operation in the manner contemplated by the Department of the Interior as evidenced by House Document 364 and by testimony introduced before this committee.

CHARACTER AND PURPOSE OF STORAGE UNITS

As a preliminary, I wish to state directly and bluntly that these storage projects are not required for the development of any irrigation or domestic water supply project now existing, now authorized, or now proposed for authorization in the bill before this committee.

Nor may they be shielded by the mantle of water conservation. The committee will observe that the 2 storage units recommended by the Secretary of the Interior will evaporate some 613,000 acre-feet annually. Compare this with the estimated stream depletion of the 11 recommended participating projects in the total amount of 401,000 acre-feet annually.

The simple truth is that at present and for the indefinite future, the sole and only useful function of these storage units will be the production of power to be sold, as a revenue-producing commodity, by the United States.

It is in this light, and this light alone, that their relationship to downstream power production and power rights must be judged.

In other words, it is the relationship between the United States with some potential 6-mill power to be sold to 10 public utility companies for revenue, on the one hand, and the United States with some already developed low-cost power which is already under contract (largely to public agencies) on the other.

It is in no degree whatever a clash between water for irrigation in the upper basin as against water for power generation in the lower basin.

As to the possibility that these storage units are essential for the development of the participating projects named in S. 500, I believe that the following table fairly states the existing situation:

	Acre-feet	
1. Consumptive use available without storage		4,300,000
2. Existing and authorized projects	2,500,000	
3. S. 500 "participating projects"	990,000	
		3,490,000
4. Consumptive use available without storage, balance		810,000

As to item 1 of this tabulation, I believe that it might well be set somewhat higher, but I know of no contention that it should be less.

Item 2 does not represent present use. On the contrary, it includes the ultimate use, after full development, covering all projects either existing or authorized. Necessarily, this full development will not be reached for some years.

The margin of safety demonstrated by the tabulation speaks for itself, and I shall not labor the point.

DAMAGE TO DOWNSTREAM POWER CONTRACTORS

I have spoken of damage to the holders of contracts for power at Hoover Dam. Actually, the damage and the attendant expense is imposed upon the retail electric consumers who are served with energy generated at Hoover Dam. In the case of the city of Los Angeles this means a direct charge upon more than 800,000 electric customers of the city.

The city department which I represent is, of course, a nonprofit organization and has no source of revenue other than payments by its customers for service rendered. Therefore, every increase in cost of power purchased by the city must be passed along in the form of increased rates to its customers.

Unfortunately, the figures involved in any analysis of the electric-generation costs of a public utility are usually either so large (billions of kilowatt hours; tens of millions of acre-feet of water) or so small (mills or fractions of mills per kilowatt hour) as to seem to have no actual relationship to real individual people. In the course of operation, however, all these figures, large and small, are ultimately reduced to simple, direct and readily understandable figures in dollars and cents on the individual customer's bill.

It is in this light that I wish to explain the stake that our customers, the people of Los Angeles, have in secondary energy in Hoover Dam.

Our contract contemplates that a total of 800,000 kilowatt-hours of such energy will be available at Hoover Dam in a year of average runoff. Of this, the city of Los Angeles is by contract entitled to 55 percent, or 440 million kilowatt-hours. House Document 364, as well as testimony at various hearings concerning upper basin storage, makes it abundantly clear that if the storage units proposed in S. 500 are built, the Department of the Interior intends to divert to this storage, during the filling period, all water which would otherwise be available for secondary generation.

In an average year, the water thus diverted to storage necessarily will be replaced by 760,000 barrels of fuel oil. At a price of $1.80 per barrel, the oil thus substituted for falling water would cost $1,365,000.

On this basis, the net increase in cost to our customers for the production of power for this item alone (cost of fuel oil versus falling-water charge) would be approximately $1,185,000.

In addition, of course, there would be a substantial labor expense for the operation of our fuel-burning plants; an expense greatly in excess of the generation charges otherwise payable at Hoover Dam.

Again, our 3 transmission lines, involving an investment of more than $30 million, would be reduced in load-factor far below the level contemplated when the investment was made in good faith. Since, in a normal year secondary energy constitutes more than one-third of the total energy taken by our system from Hoover Dam, the magnitude of the drop in load on these lines is apparent.

The committee must also remember that the system of the city of Los Angeles represents only a part of the customers now entitled to receive secondary energy from Hoover Dam. The total net extra cost for replacement fuel for all secondary energy would be, in a normal year, approximately $2,152,000.

I wish to emphasize that none of the figures which I have cited are theoretical or merely statistical in character. On the contrary, they represent things that are very tangible indeed. The 760,000 barrels of fuel oil is real oil to be purchased from real oil companies. The $1,200,000 of extra cost must be paid in real money by our individual customers.

In the case of firm energy, any diversion to storage of water necessary for the generation of the full amount contemplated by the contract is even more obviously a breach of obligations since, by formal contract, it has heretofore been recognized by the United States that firm energy is the amount of energy agreed upon as being available continuously as required during each year of the contract period.

For each kilowatt-hour (or million kilowatt-hours) of firm energy withheld, the financial burden upon our consumers would be even greater than in the case of secondary energy, for they would not only be required to pay for fuel oil and operating labor, but also bear the capital costs of building fuel-burning plants.

In conclusion, I simply point out that, in order to fulfill its obligations and maintain the integrity of its existing contracts, the United States must:

(1) Deliver at Hoover Dam, for the generation of firm and secondary energy, the full run of the river, less all upstream diversions for domestic and agricultural purposes; or

(2) During the filling period of the proposed storage units, deliver to the Hoover Dam power contractors, at the applicable contract firm or secondary rate, energy which in quantity and in time and place of delivery is equivalent to that which would have been generated at Hoover Dam had no water been diverted to this upstream storage; or

(3) During the filling period of the proposed storage units, make full financial reparation to the Hoover Dam power contractors for the costs to them (including capital costs, where appropriate) of the replacement of all firm or secondary energy which would have been generated at Hoover Dam had no water been diverted to this upstream storage.

All economic studies of these storage units have contemplated sale of the total power output at 6 mills with no provision for reparation for damage caused to the holders of downstream contracts. I believe that this is clearly erroneous and, if they are to be built, their economic value must be judged after charging them with the fulfillment, in the manner suggested as alternative (2) or (3) above, of the obligations of the United States to downstream contractors.

(The following was subsequently supplied:)

Department of water and power total sales of electric energy during the fiscal year ending June 30, 1954, averaged $0.0151 per kilowatt-hour.

(The rate schedule for the city of Los Angeles, effective January 1, 1947, as amended October 1, 1951, is a follows:)

ELECTRIC RATES WITHIN THE CITY OF LOS ANGELES, EFFECTIVE JANUARY 1, 1947

ORDINANCE NO. 91,100

An ordinance approving the rates fixed by the Department of Water and Power of the City of Los Angeles and to be charged for electical energy distributed and for service supplied by said Department to customers within the incorporated limits of the City of Los Angeles, and approving the time and the manner of payment of the same, as prescribed by said Department.

The People of the City of Los Angeles do ordain as follows:

Section 1. That the rates to be charged and collected, and the terms, provisions, and conditions to be effective respecting such rates, for electrical energy distributed and for service supplied by the Department of Water and Power of The City of Los Angeles to customers within the incorporated limits of The City of Los Angeles, heretofore fixed by resolution adopted by the Board of Water and Power Commissioners on the 8th day of October 1946 are hereby approved, such rates and conditions so fixed being as set forth in the following sections:

Section 2. That the rates to be charged and collected by the Department of Water and Power for furnishing and supplying electrical service, alternating current, for domestic and household purposes to customers within The City of Los Angeles, are hereby fixed as follows:

DOMESTIC LIGHTING AND APPLIANCE SERVICE (SCHEDULE L–1)—ALTERNATING CURRENT

Applicability

For service to any individual family accommodation devoted primarily to domestic, residential, household, and related purposes, as distinguished from commercial, professional, and industrial purposes. Motors of 5 hp individual capacity or less may be served with lighting load under this schedule where such motors are connected for 240 volts, except that motors not in excess of ½ hp individual capacity, and appliances not in excess of 1,650 watts individual capacity normally considered as "lamp socket" devices, may be served at 120 volts. All service must be through one meter, excepting as otherwise provided herein.

Character of service

Alternating current; Regulated frequency of 60 cycles; Service normally at single phase but in case of certain load installations the Department, for its operating convenience, may supply service at three phases; Delivery at 120 and 240 volts available, as may be specified by the Department.

These and other conditions of service, inclusive of starting requirements for motors, shall be in accordance with Rules and Regulations of the Department.

Rate

Customer Charge:	
Per meter, per month	$0.30
Energy Charge:	
First 45 kwh per month, for family accommodations having ten or less standard lighting circuits, and for 5 kwh per lighting circuit for each circuit in excess of ten	2.8 cents per kwh
Next 55 kwh per month	2.2
Next 100 kwh per month	1.5
Excess kwh per month	1.25
For Electric Water Heating separately metered and served in accordance with special conditions	0.70

Determination of billing

The monthly bill shall be the sum of the Customer Charge and the energy charges, but shall not be less than the "Minimum Charge." (For unit service to more than one family accommodation, see conditions under "Multiple Family Dwellings," for energy block determination.)

Bills rendered for periods other than a month shall be prorated on a monthly basis.

Minimum charge

The minimum monthly charge per customer shall be the Customer Charge; except that where air heating equipment, the primary use of which is seasonal, is used and the rated capacity therefor is in excess of 10 kw, the minimum monthly charge shall be $0.50 per kw of rated capacity of such heater load which is in excess of 10 kw, but shall be not less than $1.00 per month, and shall be on an accumulative basis over a twelve-month period.

Controlled water heating

The special water heating rate of 0.70 cents per kwh is applicable to energy supplied for one or more "approved" two-element type electric water heaters installed on a separate circuit. Each water heater must be of not less than required minimum storage capacity. For any individual family accommodation served, the total tank capacity shall be not less than an amount equal to 10 gallons for each bedroom, plus 10 gallons for each bathroom, and plus 10 gallons for each kitchen related thereto. In no event shall the tank capacity of any water heater be less than 30 gallons. For determining the required minimum tank size, the maximum number of rooms structurally planned as sleeping facilities will be determined by the Department and counted as bedrooms, and any special sleeping facilities of an unusual nature, such as large sleeping porches, wall bunks, guest dormitories, etc., may be evaluated by the Department to a normal basis of equivalent bedrooms. For water heater installations with a circulating return pipe system, or where the required hot water capacity is to be distributed through more than one water heater to a single family accom-

modation, or through one water heater to more than one family accomodation, which installations may require greater storage capacity than derived by the formula in the case of ordinary installations, and in other special cases, the acceptable tank sizes will be specified by the Department.

Hours of time control, design of heaters including voltage, insulation, and general specifications, and other conditions of service applying to such installations shall be as specified in the Rules and Regulations of the Department. However, the Department will install a separate meter together with a time switch, or relay control, providing for continuous service to the upper element of each water heater but for disconnection of service to the lower element for periods not to exceed 6 hours daily.

Multiple family dwellings

Upon written application for regular service, two or more individual family accomodations (in apartment house, "court" group, etc.) may be served as a unit under this schedule; provided that all electric load in or for such accomodations must be included. For such unit service, the readings of all necessary meters will be combined as equivalent to measurement through a single meter, and for application of the rate, all energy blocks shall be increased and shall be made equal to the sum of the respective blocks separately calculated for the maximum number of individual family accomodations included in such service.

Family accommodations totaling five or more may, if desired by the customers, take water heating service under "Controlled Water Heating" conditions for such water heating as is served in accordance with the provisions thereof, without regard to whether lighting and other loads are supplied under this or other schedules. However, only one electric water heating service metered independently of general service meters shall be permitted for any one multi-family dwelling place.

Determination of circuits

Circuits used solely for appliance or power purposes shall not be included in the lighting circuit count. However, where circuits are used jointly for lighting and appliance or other power purposes, a properly determined equivalent number of "lighting circuits" for the lighting thereon shall be included in the lighting circuit count.

Section 3. That the rates to be charged and collected by the Department of Water and Power for furnishing and supplying the electrical service requirements, alternating current, for general lighting purposes to customers within The City of Los Angeles, are hereby fixed as follows:

GENERAL LIGHTING SERVICE (SCHEDULE L–2)—ALTERNATING CURRENT

Applicability

For general lighting service purposes with or without appliances or other power on the same service. Motors of 5 hp individual capacity or less may be served with lighting load under this schedule where such motors are connected for not less than 240 volts, except that motors not in excess of ⅛ hp individual capacity, and appliances not in excess of 1650 watts individual capacity normally considered as "lamp socket" devices may be served at 120 volts. Motors in excess of 5 hp individual capacity may be served together with lighting load under this schedule, provided service is taken at delivered voltage not less than 480 as may be supplied by the Department, with the customer furnishing and installing, or making suitable provision therefor at his expense, all transformers which may be required for obtaining voltages other than as delivered.

This schedule is not applicable to standby or auxiliary service.

Character of service

Alternating current: Regulated frequency of 60 cycles; Service normally at single phase but in case of certain load installations the Department, for its operating convenience, may supply service at three phase; Delivery at 120 and 240 volts available, and at other voltages, as may be specified by the Department.

These and other conditions of service, inclusive of starting requirements for motors, shall be in accordance with Rules and Regulations of the Department.

Rate

	Cents per kwh
Customer charge:	
Per meter, per month	$0.30
Energy charge:	
First 100 kwh per month	2.8
Next 200 kwh per month	2.6
Next 700 kwh per month	2.2
Next 4,000 kwh per month	1.7
Next 100 kwh per kw of "Maximum Demand," per month, but based on not less than 20 kw of demand, and for not more than 30,000 kwh	1.4
Next 200 kwh per kw of "Maximum Demand," per month, but based on not less than 20 kw of demand	0.80
Excess kwh	0.70

Determination of billing

The monthly bill shall be the sum of the Customer Charge and the energy charges, but shall be not less than the "Minimum Charge."

Bills rendered for periods other than a month shall be prorated on a monthly basis.

Minimum charge

The minimum monthly charge per customer shall be the Customer Charge; except that where service is taken at delivered voltage of 480 or higher the minimum charge at the customer's option shall be either:

(1) $0.50 per horsepower of all power, heating, and cooking "Connected Load" (other than appliances not in excess of 1,650 watts individual capacity, normally considered as "lamp socket" devices) but shall be not less than the Customer Charge; or

(2) $0.75 per month per kw of "Maximum Demand" created in the month or $0.75 per month per kw of the highest "Maximum Demand" created during the preceding eleven months period, whichever is higher; provided that such minimum charge shall be not less than $0.50 per month per kva of transformer capacity which the Department finds necessary to serve the customer's load and for which the customer obligates himself in writing, and shall be not less than $100.00 per month. However, the minimum charge may be based on demand only upon written application therefor by the customer. Such application may be cancelled by the customer at any time, at his request, but if in effect for less than 12 months, then bills previously rendered under authority of such application shall be recomputed and billing adjustment shall be made in accordance with minimum charge based upon "Connected Load."

Connected load

When referred to herein, "Connected Load" shall signify the rated capacity of the maximum load that can be energized directly and simultaneously from the Department's lines. In cases where connected loads are indeterminate or transient in nature, the Department may establish the basis of determining "Connected Load."

The Department may not be required to compute "Connected Load" beyond the nearest 0.1 hp.

Maximum demand

"Maximum Demand" shall signify the average demand in the fifteen-minute interval in which such average is greater than in any other fifteen-minute interval in the billing period. "Maximum Demand" may be determined by the Department at its discretion on a basis considered to be equivalent to such average demand, by tests from time to time, or by means of appropriate recording meters furnished and installed by the Department. In cases where the energy demand is intermittent or subject to violent fluctuation, the Department may select a shorter interval for measurement of "Maximum Demand."

Section 4. That the rates to be charged and collected by the Department of Water and Power for furnishing and supplying the electrical service requirements, direct current, for general lighting purposes, to customers within The City of Los Angeles, are hereby fixed as follows:

GENERAL LIGHTING SERVICE (SCHEDULE L–3)—DIRECT CURRENT

Applicability

For general lighting service purposes with or without appliances or other incidental power on the same service. Service available only in downtown section of the City and generally only to existing customers.

This schedule is not applicable to standby or auxiliary service.

Character of service

Direct current: Nominal voltages of 120 and 240 as may be available.

These and other conditions of service shall be in accordance with Rules and Regulations of the Department.

Rate

	Cents per kwh
First 250 kwh per month	5.5
Next 250 kwh per month	5.2
Next 500 kwh per month	4.4
Next 1,000 kwh per month	3.5
Next 1,000 kwh per month	2.6
Excess kwh per month	2.16

Determination of billing

The monthly bill shall be the sum of the energy charges, but shall be not less than the "Minimum Charge." Initial bills for service for one month or less, except in cases where service is temporary in character, shall be determined without regard to the "Minimum Charge."

Bills rendered for periods other than a month shall be prorated on a monthly basis.

Section 6. That the annual rates to be charged and collected by the Department of Water and Power for furnishing and supplying electrical energy and service for utilitarian lighting purposes within The City of Los Angeles, are hereby fixed as follows:

UTILITARIAN LIGHTING SERVICE (SCHEDULE L–5)

Applicability

For service, including energy, supplied to utilitarian lighting installations for purposes of street, highway, and traffic safety lighting of thoroughfares. The Department will furnish, install, and own the necessary poles, circuits, luminaires, and supporting fixtures, and will maintain the entire system.

Rate "A"—For incandescent light service

Lamp rating	Equipment	Annual charge per light
Series systems:		
1,000 lumen or less	Reflector	$16.68
2,500 lumen	Reflector	26.04
2,500 lumen	Refractor or Enclosing Globe	27.00
4,000 lumen	Refractor or Enclosing Globe	34.08
6,000 lumen	Refractor or Enclosing Globe	41.76
10,000 lumen	Refractor or Enclosing Globe	54.00
15,000 lumen	Refractor or Enclosing Globe	67.20
Multiple systems:		
100 watt	Reflector	17.76
200 watt	Reflector	32.40
300 watt	Refractor or Enclosing Globe	40.44
500 watt	Refractor or Enclosing Globe	51.24
1,000 watt	Refractor or Enclosing Globe	76.44

Rate "B"—For mercury vapor light service

[Annual Charge Per Light (For luminaire containing a mercury vapor lamp alone or in combination with incandescent lamp as shown)]

Lamp Rating:	
400 watt mercury vapor lamp	$65.16
400 watt mercury vapor lamp in combination with 4,000 lumen incandescent lamp	79.68
400 watt mercury vapor lamp in combination with 200 watt incandescent lamp	79.68

Rate "C"—For sodium vapor light service

[Annual Charge Per Light]

Lamp Rating:	
10,000 lumen	$58.92

Character of service

Lights equipped with 1,000 lumen, 2,500 lumen, 100 watt, and 200 watt lamps will be bracket mounted. Lights with lamps of higher ratings will be center suspension, mast arm, or pole top mounted.

These and other conditions of service shall be in accordance with Rules and Regulations of the Department.

Determination of billing

The rates specified in this schedule are for lights operated in accordance with "Standard All Night Schedule of Operation."

The rate for a light operated on an extended special schedule of operation shall be computed by increasing the listed rate by 1/25 thereof, per hour of average daily deviation on an annual basis from "Standard All Night Schedule of Operation," computed to the nearest whole cent.

The monthly bill for lights operated on a calendar month basis shall be computed at 1/12 of the applicable annual rates.

Bills rendered for lights in operation for periods other than a full calendar month, shall be computed at 1/360 of the applicable annual rate for each night in operation.

For temporary turn-ons of street lighting at times other than regular scheduled hours of operation, the rate shall be $10,000 per turn-on as a service charge plus 3.5 cents per kwh. In such cases the kilowatt-hours shall be computed on the basis of the rated demand of the lamps (including the lamp auxiliaries) in operation and the hours of use.

Bills for each calendar month operation of lights shall be payable on or before the tenth day of the following month. Bills for utilitarian lighting service supplied at the direction of the Board of Public Works shall be paid monthly by said Board on or before the tenth day of the month for the service so furnished in the preceding month upon demands drawn against the funds provided by the City Council for such purposes.

All bills unpaid 15 days after rendering thereof shall be deemed delinquent and service may be discontinued without further notice.

Operation schedules

Upon acceptance of written application of the customer, lights will be controlled each night in accordance with schedules of operation hereunder:

(a) Standard All Night Schedule of Operation: During the months of April, May, June, July, August, and September, lights shall be lighted 30 minutes after sunset and extinguished one hour before sunrise, and during the months of October, November, December, January, February, and March, shall be lighted 15 minutes after sunset and extinguished 30 minutes before sunrise.

(b) Special Schedule of Operation: Only where conditions warrant the earlier and/or later extinguishing of lights than as provided under "Standard All Night Schedule of Operation," the Department may provide service under a suitable schedule of operation as mutually agreed upon by the Department and the customer, but then only if the customer agrees to pay for any extra costs involved in furnishing special switching and other service in connection therewith.

(c) Photo-Electric Controller Operation: In lieu of controlling any lighting operation with reference to sunset and sunrise in schedules of operation, the Department may, at its discretion, control the lighting and/or extinguishing of lamps by means of photo-electric controllers so arranged as to insure that the lamps will be energized during periods whenever natural daylight values are 3/10 of a foot-candle or less on a horizontal plane in open areas.

Section 7. That the rates to be charged and collected by the Department of Water and Power for furnishing and supplying the electrical service requirements, alternating current, for general power purposes, to customers within The City of Los Angeles, are hereby fixed as follows:

GENERAL POWER SERVICE (SCHEDULE P-1)—ALTERNATING CURRENT

Applicability

For general power service purposes on the basis of measurement of service at the delivered voltage. Customers taking service for large manufacturing

may use energy for purposes other than power as outlined under conditions for such use.

This schedule is not applicable to standby or auxiliary service.

Character of service

Alternating current; Regulated frequency of 60 cycles; Single and three phase; Delivery at 120, 240, and 480 volts available, and at primary or other voltages as may be specified by the Department.

These and other conditions of service, inclusive of starting requirements for motors, shall be in accordance with Rules and Regulations of the Department.

Rate

Quantity Rate (Subject to Load Factor Provisions "A" and "B"):

	Cents per kwh
First 100 kwh per month	3.1
Next 200 kwh per month	2.6
Next 700 kwh per month	2.2
Next 1,000 kwh per month	1.7
Next 4,000 kwh per month	1.2
Next 4,000 kwh per month	1.0
Next 290,000 kwh per month	0.80
Excess kwh per month	0.75

Load Factor Provision "A" (Calculated Horsepower Demand Basis): Applicable when the Connected Load is less than 65 hp.

The "Quantity Rate" shall apply to the first 75 kwh per hp of "Calculated Horsepower Demand," per month, but computed on not less than a 2 hp basis.

	Cents per kwh
For all excess kwh per month	0.80

Load Factor Provision "B" (Kilowatt Demand Basis): Applicable when the Connected Load is 65 hp or over

(a) For Billed Demands of Less Than 150 Kw: The "Quantity Rate" shall apply to the first 100 kwh per kw of "Billed Demand," per month, but computed on not less than a 20 kw basis.

	Cents per kwh
For the next 15,000 kwh per month	0.80
For the next 50,000 kwh per month	0.60
For all excess kwh per month	0.50

(b) For Billed Demands of 150 Kw or Over but Less Than 1,000 Kw: The "Quantity Rate" shall apply to the first 200 kwh per kw of "Billed Demand," per month.

	Cents per kwh
For the next 50,000 kwh per month	0.60
For all excess kwh per month	0.50

(c) For Billed Demands of 1,000 Kw or Over: The "Quantity Rate" shall apply to the first 200 kwh per kw of "Billed Demand," per month, but computed on not less than a 1,000 kw basis.

	Cents per kwh
For the next 50 kwh per kw of "Billed Demand," per month	0.60
For the next 100 kwh per kw of "Billed Demand," per month	0.50
For all excess kwh per month	0.35

Determination of billing

The monthly bill shall be computed under Load Factor Provision "A" or "B," according to the size of the customer's installation, except as otherwise provided under conditions relative to "Minimum Charge" and "Power Factor Discount."

The total monthly bill shall be the sum of the applicable energy charges, less any discount applicable under "Power Factor Discount," but shall be not less than the "Minimum Charge"; provided further that when any discount is applicable for power factor then the net bill shall be in no case rendered at less than $2.00 per kw of "Billed Demand."

Bills rendered for periods other than a month shall be prorated on a monthly basis.

Minimum charge

(1) The minimum monthly charge per customer shall be based on "Calculated Horsepower Demand" except that when the connected load exceeds 150 hp, the minimum charge, on written application of the customer, may be based on kilowatts of demand; provided further that for customers receiving service in accordance with conditions as outlined under "Energy Use for Purposes Other Than Power," the minimum charge shall be based on kilovolt-amperes of transformer capacity.

(2) When the minimum monthly charge is based on "Calculated Horsepower Demand" such minimum charge shall be $0.50 per month per hp of "Calculated Horsepower Demand" but not less than $1.50 per month.

(3) When the minimum monthly charge is based on kilowatts of demand such minimum charge shall be $0.75 per month per kw of "Billed Demand"; provided that such minimum charge shall be not less than $0.50 per month per kva of transformer capacity which the Department finds necessary to serve the customer's load, and for which the customer obligates himself in writing, and shall be not less than $50.00 per month. However, the minimum charge may be based on demand only upon written application therefor by the customer. Such application may be cancelled by the customer at any time, at his request, but if in effect for less than 12 months, then bills previously rendered under authority of the application shall be recomputed, and billing adjustment shall be made in accordance with minimum monthly charge based upon "Calculated Horsepower Demand."

(4) When the minimum monthly charge is based on transformer capacity such minimum charge shall be $0.35 per kilovolt-ampere of transformer capacity, utilization of which is required to serve the customer's load.

(5) The minimum charge shall be waived on all initial bills where the service shall have been for one month or less. However, in cases where the service is temporary in character, and the entire period of such service is less than ½ of a month, then the bill shall be not less than ½ of the minimum monthly charge.

Connected load

When referred to herein, "Connected Load" shall signify the rated capacity of the maximum load that can be energized directly and simultaneously from the Department's lines. For application of this schedule each horsepower of rated capacity of motors, each kilowatt of rated capacity of stationary apparatus other than standard distribution transformers and each kilovolt-ampere of standard distribution transformer capacity, and each kilovolt-ampere of output capacity of frequency changers shall be considered as equivalent to one horsepower of connected load. In the case of multiple rated motors, or where connected loads are indeterminate, or transient in nature, the Department may establish the basis of determining connected load.

The Department may not be required to compute "Connected Load" beyond the nearest 0.1 hp.

Calculated horsepower demand

(1) When the Connected Load is 10 hp. or less, the "Calculated Horsepower Demand" shall be determined at 100 percent of the horsepower of Connected Load, but in no case at less than 2 hp.

(2) When the Connected Load exceeds 10 hp., the "Calculated Horsepower Demand" shall be determined as follows:

	Percent of the horsepower
For the largest unit of Connected Load	100
For the next largest 4 units of Connected Load	80
For the next largest 5 units of Connected Load	60
For the balance of the Connected Load	30

Except, that such total calculated demand shall not be taken at less than 40 percent of the "Connected Load," nor in any case at less than 10 hp.

(3) The Department may not be required to compute "Calculated Horsepower Demand" beyond the nearest 0.1 hp.

Billed demand

The "Billed Demand" used each month shall be the "Maximum Demand" for such month, or 70 percent of the highest demand established as "Billed Demand" during the months of November, December, January, or February of

the preceding 11 months period, whichever is the higher; provided, however, that demands occurring between the hours of 10:30 P. M. of any one day and 7:30 A. M. of the following day, and any demands occurring on Sundays, New Year's Day, Memorial Day, Fourth of July, Labor Day, Thanksgiving Day or on Christmas Day, shall not be considered for computation of kwh. per kw. under Load Factor Provision "B," if the customer has provided at his own expense the additional metering equipment as may be required by the Department for such purpose. Whenever in any month a lower bill is produced by the use of a demand greater than otherwise established hereunder, such greater demand shall be established as the "Billed Demand."

Maximum demand

"Maximum Demand" shall signify the average demand in the fifteen-minute interval in which such average is greater than in any other fifteen minute interval in the billing period. "Maximum Demand" may be determined by the Department at its discretion on a basis considered to be equivalent to such average demand, by tests from time to time, or by means of appropriate recording meters furnished and installed by the Department. In cases of hoists, elevators, welding machines, furnaces, and other installations where the energy demand is intermittent or subject to violent fluctuation, the Department may select a shorter interval for measurement of "Maximum Demand."

Power factor discount

A power factor discount on bills computed under Load Factor Provision "B" shall be allowed, upon written application therefor by a customer, whenever the average power factor is maintained in excess of 80 percent lagging, subject to the following conditions:

1. The "Billed Demand" must be for not less than 150 kw, and the sum of the gross monthly energy charges must exceed $2.00 per kw of "Billed Demand."

2. The discount shall be 0.5 percent for each 1.0 percent that the average power factor exceeds 80.0 percent to and including 90.0 percent, plus 0.2 percent discount for each 1.0 percent that such power factor exceeds 90.0 percent, with a maximum discount of 7 percent for unity or leading power factors.

3. The net bill, after application of the discount, shall be not less than $2.00 per kw of "Billed Demand."

4. Average power factor shall be determined at the discretion of the Department by tests from time to time, or on a weighted monthly average basis by means of a reactive kilovolt-ampere-hour meter furnished and installed by the Department. Weighted monthly average power factor shall be determined from the relation between the measured reactive kvah and the kwh. The Department may ratchet such reactive kilovolt-ampere-hour meter to prevent its reverse operation on leading power factor.

5. Power factor shall be computed to the nearest 0.1 of one percent.

Energy use for purposes other than power

Service under this schedule may include, at the option of the customer, energy for purposes other than power where service is used primarily for manufacturing purposes in amounts normally requiring utilization of transformer service equipment of 1,000 kilovolt-amperes capacity or more, subject to conditions as follows:

(1) Suitable permanent substation structures shall be provided and maintained by the customer at his expense, and transforming, switching, and other related equipment necessary for connection, within such substation, to the Department's standard high-tension transmission circuits (34,500 volts or higher as may be required) shall be provided, installed, and maintained by the Department with charges therefor to be paid by the customer to the Department each month in the amount of 1 percent of the cost, determined as of the time of installation of any equipment so provided, based on the Department's schedule of average unit costs prevailing for standard items at such time, plus due allowances with respect to any required departure from the Department's normal installation practice; provided that in cases where required transforming equipment does not conform to the Department's specifications, the Department may require the customer to provide, install, and maintain such equipment, and retain ownership thereof without application of the 1 percent charge. Where any customer has heretofore provided standard transforming, switching, and high tension substation equipment (34,500 volts or higher) and retains ownership thereof, then the 1 percent charge shall not apply, but such equipment shall be maintained by the Department at the expense of the customer.

(2) Where the first transformation for the entire service is to a secondary three-wire service of not less than 480 volts, the Department shall measure demands and energy on the basis of delivery being at such secondary voltage.

Section 8. That the rates to be charged and collected by the Department of Water and Power for furnishing and supplying the electrical service requirements, direct current, for general power purposes, to customers within The City of Los Angeles, are hereby fixed as follows:

GENERAL POWER SERVICE (SCHEDULE P–2)—DIRECT CURRENT

Applicability

For general power service purposes. Service available only in downtown section of the city and generally only to existing customers.

This schedule is not applicable to standby or auxiliary service.

Character of service

Direct current; Nominal voltages of 120, 240, and 550 as may be available.

These and other conditions of service shall be in accordance with Rules and Regulations of the Department.

Rate

	Cents per kwh
First 100 kwh per month	5.00
Next 400 kwh per month	4.20
Next 1,000 kwh per month	2.70
Next 1,500 kwh per month	1.70
Next 3,000 kwh per month	1.35
Next 14,000 kwh per month	1.20
Next 30,000 kwh per month	1.12
Excess kwh per month	1.03

Determination of billing

The monthly bill shall be the sum of the energy charges, less the discount for load factor if any is applicable, but shall be not less than the "Minimum Charge."

Bills rendered for periods other than a month shall be prorated on a monthly basis.

Load factor discount

Upon written application for load factor discount, customers shall be allowed a discount upon the rates for energy whenever the monthly consumption, as recorded by meter, exceeds 20,000 kilowatt hours provided the load factor exceed 35 percent. The discount shall be 1 percent for each 2½ percent increase of the load factor above 35 percent, the discount in no case to exceed 16 percent.

Load factor shall be computed on the kilowatts of "Maximum Demand" established for each month, but on not less than 40 percent of the "Connected Load" (746 watts per horsepower).

Minimum charge

The minimum charge per customer shall be $0.60 per month per horsepower of "Connected Load" but not less than $1.80 per month.

The minimum charge shall be waived on all initial bills where the service shall have been for one month or less except in cases where the service is temporary in character.

Maximum demand

"Maximum Demand" shall signify the average demand in the fifteen-minute interval in which such average is greater than in any other fifteen-minute interval in the billing period. "Maximum Demand" may be determined by the Department at its discretion on a basis considered to be equivalent to such average demand, by tests from time to time, or by means of appropriate recording meters furnished and installed by the Department. In cases of hoists, elevators, and other installations where the energy demand is intermittent or subject to violent fluctuation, the Department may select a shorter interval for measurement of "Maximum Demand."

Connected load

When referred to herein, "Connected Load" shall signify the rated capacity of the maximum load that can be energized directly and simultaneously from the Department's lines. For application of this schedule, each horsepower of rated

capacity of motors, and each kilowatt of rated capacity of stationary apparatus, shall be considered as equivalent to one horsepower of connected load.

The Department may not be required to compute "Connected Load" beyond the nearest 0.1 hp.

Section 9. That the rates to be charged and collected by the Department of Water and Power for furnishing and supplying electrical service to customers within The City of Los Angeles for standby or auxiliary purposes, are hereby fixed as follows:

STANDBY OR AUXILIARY SERVICE TO PRIVATE ELECTRICAL PLANTS (SCHEDULE CS)

Applicability

For purposes of standby or auxiliary service to lighting and/or power loads which are also supplied with electrical service or other motive power from a privately owned plant.

Any customer taking service under this schedule shall obligate himself for same for a period of not less than 12 consecutive months, specifying in a written application therefor the number of kilowatts of demand of standby or auxiliary capacity for which service is desired.

Any electrical service delivered by the Department to a customer who supplies part of the electrical energy requirements from a privately owned plant shall be considered as auxiliary service, to which this schedule is applicable. However, the Department may supply, to a customer taking some service under this schedule, additional amounts of energy under regular service schedules for the balance of his requirements if electrically isolated from the part taken hereunder.

Direct current service is available only in the downtown section of the City, and generally only to existing customers.

Character of service

Character, and other conditions, of service shall be in accordance with Rules and Regulations of the Department.

Rate "A"—For alternating current service

	Per kw per month
Demand Charge:	
First 80 kw of demand	$1.50
Next 120 kw of demand	1.00
Next 300 kw of demand	.70
Excess kw of demand	.60
Energy Charge:	*Cents per kwh*
First 10,000 kwh per month	$1.80
Next 30,000 kwh per month	.90
Next 60,000 kwh per month	.75
Excess kwh per month	.65

Rate "B"—For direct current service

The rates shall be those under Rate "A" increased by 20 percent.

Determination of billing

The total monthly bill except as otherwise provided under conditions relating to "Restricted Service," shall be the sum of the Demand Charge and the Energy Charge.

The Demand Charge shall be computed on the actual "Maximum Demand" created each month, but on not less than 70 percent of the total "Maximum Demand" the customer is obligated for and on not less than 25 kw.

A discount of 5 percent shall apply on the total bill where the service to the customer is delivered at primary voltage of 2,400 or over, as may be supplied, and the customer at his own expense furnishes and installs all necessary transformers.

Bills rendered for periods other than a month shall be prorated on a monthly basis.

Restricted service

When the customer, by agreement with the Department in a special written application therefor, operates so as to create a reduced demand on the Department's service during the restricted hours from 4:30 p. m. to 10:30 p. m. on any day other than Sunday, Thanksgiving, Christmas, and New Year's days,

in the 4 consecutive months of November, December, January, and February, and when such customer furnishes and installs at his own expense additional metering equipment as may be required by the Department, then the total monthly bill in aforesaid 4 consecutive months shall be the demand charge, based upon the said reduced demand during the 4 consecutive months, plus the energy charge as provided in the schedule, and in the succeeding 8 months the total monthly bill shall be the demand charge based upon the said reduced demand in the aforesaid 4 consecutive months, plus the energy charge, but the total payment due for the period of said succeeding 8 months shall be an amount of not less than 12 times the total monthly demand charge based on the total "Maximum Demand" the customer is obligated for under conditions of this schedule, payable in an average sum per month of not less than ⅛ of the minimum amount, beginning with March of each year. In the event such customer creates a demand during the aforesaid restricted hours in any of the aforesaid 4 consecutive months in excess of the reduced demand specially applied for, then the demand charge for the calendar month in which the excess demand occurs and for each of the succeeding 11 calendar months shall be computed on said demand created during the aforesaid restricted hours in said month. However, when said excess demand is caused by unavoidable emergency in the customer's plant and the Department is promptly notified thereof, the demand charge in excess of that computed on the reduced demand specially applied for will be applied only to the calendar month in which said excess demand occurred.

Maximum demand

When the Department stands in readiness to supply the "Maximum Demand" of the customer's entire capacity or isolated part thereof, then the "Maximum Demand" of such capacity shall be determined at the discretion of the Department by test from time to time or monthly by meters to be furnished and installed by the Department.

When the Department stands in readiness to supply a demand less than the "Maximum Demand" of the customer's entire capacity connected to the Department's service switch, then the customer shall at his own expense, furnish and install a suitable circuit breaker or other automatic circuit opening device which the Department requires to be enclosed in a steel box equipped with lock and key, all to be approved by and under the sole control of the Department, and the adjustment and operation of such circuit opening equipment to be in no way interfered with by the customer. The circuit opening equipment shall be set to disconnect the customer's load from the Department's service whenever a demand is created thereon in excess of the demand the customer is obligated for.

In the event the customer creates a "Maximum Demand" as determined by the Department to be in excess of the demand originally applied for, thenceforth for a period of not less than 12 consecutive months such demand shall constitute the demand for which the customer becomes obligated.

"Maximum Demand" shall signify the average demand in the fifteen-minute interval in which such average is greater than in any other fifteen-minute interval in the billing period. "Maximum Demand" may be determined by the Department at its discretion on a basis considered to be equivalent to such average demand, by tests from time to time, or by means of appropriate recording meters furnished and installed by the Department. In cases of hoists, elevators, welding machines, furnaces, and other installations where the energy demand is intermittent or subject to violent fluctuation, the Department may select a shorter interval for measurement of "Maximum Demand."

Section 10. That the rates to be charged and collected by the Department of Water and Power for furnishing and supplying electrical service, alternating current, to traffic signals and warning facilities and for service to certain sodium vapor lamps within the City of Los Angeles, are hereby fixed as follows:

TRAFFIC CONTROL SERVICE (SCHEDULE CTC)

Applicability

For service to all traffic signals and warning facilities, including semaphore signals, bell signals, and flashers, for governmental agency purposes.

Sodium vapor lamp installations in service on July 31, 1939, under the Metered Rate of the Traffic Control Service Schedule then in effect, may continue to receive service hereunder. The applicability of this schedule is closed to all other sodium vapor lamp installations made subsequent to July 31, 1939.

Character of service

Energy will be furnished at service points mutually agreed upon between customer and the Department.

Conditions of service shall be in accordance with Rules and Regulations of the Department.

Rate

Customer Charge:
For each point of service delivery (per month)..... $1.00
Energy Charge:
For all energy (cents per kwh)..... 2.2

Determination of billing

The total monthly bill shall be the sum of the Customer Charge and the Energy Charge.

Bills rendered for periods other than a month shall be prorated on a monthly basis.

Section 11. That the rates to be charged and collected by the Department of Water and Power for furnishing and supplying electrical service for temporary power or light purposes, to customers within the City of Los Angeles, are hereby fixed as follows:

TEMPORARY SERVICE (SCHEDULE CTS)

Applicability

For service, as may be available at the discretion of the Department, for purposes of limited power or lighting use of a temporary nature, including service to floor finishers, skill saws, pipe cutters, paint sprayers, stationary saws, concrete mixers, and other similar finishing and construction equipment, and temporary construction lights.

Each applicant for temporary service may be required to deposit with the Department a sum of money equal to the estimated amount of the Department's bill for service, or to otherwise secure, in a manner satisfactory to the Department, the payment of any bills which may accrue by reason of service furnished or supplied hereunder.

Character of service

This schedule is limited to such power and light load of a temporary nature, as can be served from an existing single phase 120/240 volt distribution line or service with meter of capacity not exceeding 25 amperes, and provided line construction or additional transformer capacity is not required.

In order to receive service under this schedule, the customer shall be required to furnish and install, at his own expense, a suitable pole or other adequate supporting structure within such distance from the Department's service facilities as it may specify. The Department's connection panel box will then be installed on such pole or structure, and the customer may make connection to the panel box for such load as may be authorized at the time of his application for service, which load in no event shall total more than 10 kw connected at any time. The Department reserves the right to discontinue service, without notice, whenever in its opinion such service is no longer temporary in character or not needed, or if used for unauthorized purposes.

Other conditions of service shall be in accordance with Rules and Regulations of the Department.

Rate

Customer Charge:
For the first month or less, and for each succeeding month, per meter.. $2.50
Energy Charge:
For all energy (cents per kwh)..... 2.5

Determination of billing

The total bill shall be the sum of the Customer Charge and the Energy Charge.

When the total period of service is for more than one month and the bills are rendered for periods other than a month, the Customer Charge shall be prorated on a monthly basis.

Section 12. That the rentals to be charged and collected by the Department of Water and Power for supplying electric meters to customers within the City of Los Angeles, are hereby fixed as follows:

ELECTRIC METER RENTALS (SCHEDULE EM)

Applicability

For rental of the Department's electric meters to customers for their own purposes, subject to the Rules and Regulations of the Department.

Rate

	Per meter per month
For Alternating Current Meters:	
Single Phase 2 or 3 wire, 120 or 120/240 volts:	
5 to 10 amperes	$0.10
15 to 50 amperes	.20
75 to 100 amperes	.35
Over 100 amperes:	
2 wire	.45
3 wire	.80
Polyphase, 240 or 240/480 volts:	
5 to 15 amperes	.35
25 to 50 amperes	.50
75 to 100 amperes	.70
Over 100 amperes	1.00
For Direct Current Meters:	
2 wire, 120 or 240 volts:	
5 to 10 amperes	.10
15 to 50 amperes	.35
75 to 100 amperes	.50
3 wire, 120/240 volts:	
5 to 10 amperes	.10
15 to 50 amperes	.35
75 to 100 amperes	.75

Other rate conditions

The rental charges for any two-element or three-element watt-hour meters for special single-phase measurement, shall be respectively $1.60 and $2.40 per meter per month.

Whenever demand attachments are furnished in conjunction with rented watt-hour meters, an additional rental charge shall be made in the amount of $0.50 per month for each such attachment.

The rental charges for any meters not otherwise provided for herein, shall be on a basis of 1¼ percent per month of the estimated installed cost of said meters, but in no case shall such rental charges be less than $0.20 per meter per month.

Such meters and demand attachments are to be at all times the property of the Department. Collection of rental charges shall not prevent the Department from collecting additional charges if such rental equipment is damaged by negligence of the customer.

Section 13.

GENERAL PROVISIONS

(1) Rate Schedule Applicability: In the event of any dispute as to rate or rates to be paid by the customer, the Board of Water and Power Commissioners reserves the right to determine which of the electric rate schedules, rates, or conditions is applicable to the case.

(2) Rules and Regulations: The Board of Water and Power Commissioners may prescribe from time to time as the Board deems necessary or desirable, rules and regulations relating to conditions of service, and application, administration, and/or interpretation of rates, and relating to other provisions set forth herein.

On failure to comply with the Rules and Regulations as prescribed by the Department, or to pay rates or meter rental, or to comply with any charge or penalties imposed for such failure as herein provided, electric service may be turned off until the Rules and Regulations or said penalties are complied with and/or payment is made of the amount due, if any, and $1.00 paid for the expense of turning the service off and on. In the event the customer turns on the electric service or suffers or causes it to be turned on after it has been turned off for any of the above reasons, the Department may again turn off the electric service, remove the meter, and may charge and collect $5.00 in addition to other amounts due from the customer before electric service is restored. In case the customer's service is discontinued for nonpayment of bill for electric service, or where notice of discontinuance for nonpayment of bill has been given,

the Department may require customer to reestablish his credit by the making of a cash deposit as provided herein.

(3) Metering: For the purpose of computing charges, each meter upon the customer's premises will be considered separately, and readings of two or more meters will not be combined as equivalent to measurement through one meter except where the Department determines:

(a) That the combination of meter readings is specifically provided for in the rate schedules.

(b) That the maintenance of adequate service and/or that the Department's operating convenience shall require the installation of more than one meter upon the customer's premises.

(c) That the customer has on his premises two or more meters for one class of service for his own use, and not for separate tenants, and that such meters are supplied, (1) by service connections which were in existence on an electric distribution system prior to the date of its acquisition by the Department, or which were installed by the Department prior to July 1, 1932, but in either of these cases only if the combination of meter readings shall have been in effect for any customer prior to July 1, 1947, and not subsequently cancelled at the request of a customer; or (2) by service connections which are not solely for the maintenance of adequate service and/or for the Department's operating convenience and for which the Department accepts the application of the customer for combination of meter readings. For meter readings combined in accordance with this provision (c), as equivalent to measurement through one meter, the Department shall make a monthly charge of 1¼ percent of the computed cost of furnishing and installing all meters and services and line and transformer construction additional to that which in the opinion of the Department is the minimum required to supply the customer through one meter, or such meters as are required for the maintenance of adequate service and/or for the Department's operating convenience, such charge in no case to be less than $0.90 per month, plus $0.10 per meter per month for such additional meters. Such application for combining of meter readings may be cancelled at any time upon request of the customer, provided that where cancellation is made in less than 12 months after the effective date of the application for combining of meter readings, the bills which were rendered under the authority thereof, shall be recomputed and billing readjustment made as if such combination had not been in effect.

(4) Definition of Customers: The term "Customer" is hereby defined, subject to the provision of Paragraph (3) respecting "Metering", as meaning a person, public or private corporation, copartnership, unincorported association, The United States, The State of California, any county, or any governmental agency, who is entitled to service in accordance with the Department's Rule and Regulation relating to "Premises".

(5) Time and Manner of Payment of Bills: Bills, except as provided otherwise in the schedules, are due and payable on presentation and become delinquent—

15 days after presentation where bills are made out monthly,
4 days after presentation where bills are made out weekly,

and if not paid upon becoming delinquent the electric service may be turned off without further notice.

Payment shall be made at the offices of the Department in person or by mail, or at the Department's option, to duly authorized collectors of the Department.

(6) Deposits: A deposit in cash or other evidence of sufficient credit satisfactory to the Department to guarantee payment of bills may be required in an amount not exceeding the charges for the estimated quantity consumed in two months, except as may be required for temporary service, provided that no deposit shall be less than $2.50.

(7) Meter Reading for Special Purposes of Customers: The Department may at its option and upon application by the customer undertake to read regularly meters rented or owned by customers for their own special purposes, subject to the Rules and Regulations of the Department. In such cases the Department will furnish to the customer a memorandum of readings and shall make a charge of $0.10 for each reading so furnished. Upon special request and where conditions warrant, the Department at its option may also furnish in conjunction with such readings a memorandum of charges corresponding to computations as in accordance with the appropriate established rate schedule.

(8) Service Obtained from Another Utility for Special Standby Purposes of Customers: In the case of certain governmental or other customers where the

character of load is such as to warrant an especially high degree of service continuity, the Department, on application of the customer, may undertake to supply, in conjunction with regular service, a standby service obtained from another utility. The customer's application shall state the number of kilowatts of load for which standby is desired, and which standby shall be for not less than 250 kw. Where such standby is made available, the Department's billing for combined service, including regular use and standby, shall be made in accordance with the appropriate standard schedule, to which billing there shall be added a standby charge as determined hereinafter.

The standby charge shall be based on the actual service costs incurred by the Department in obtaining standby power from the other utility; provided that in the event any energy is used through the standby connection, for which billing to the customer is made under the Department's standard schedules but which is not supplied from the Department's own sources, a credit shall be allowed, in the amount of 6 mills per kilowatt-hour of such standby energy; provided further that in rendering billing to the customer, the standby charge, after the foregoing credit, if any, shall be increased by 10 percent to cover incidental expenses related to the furnishing of the standby service, and such net standby charge shall be determined for each billing period in which regular service is rendered.

The added cost of any pole lines, fixtures, transformers, metering equipment, etc., which may be required in excess of that necessary for regular service shall be as determined by the Department, and shall be borne by the customer either by cash payment, or on the basis of a monthly charge of 1¼ percent of such added investment cost, or by some other equitable method as may be mutually agreed upon between the customer and the Department.

Section 14. That all electric rate schedules, inclusive of terms, provisions, and conditions, as provided herein, shall apply to and shall become effective on all regular bills for electrical service rendered on and after the first day of the calendar month next succeeding the effective date of this ordinance.

Section 15. That Ordinance No. 88,805 and all other ordinances or provisions thereof which may be in conflict herewith are hereby repealed, provided however that the rate schedules, conditions, and provisions approved by said ordinance No. 88,805 shall remain in effect until the rate schedules, conditions, and provisions provided for herein shall have become effective.

Section 16. That the City Clerk shall certify to the passage of this ordinance and shall cause the same to be published once in The Los Angeles Daily Journal and The Los Angeles News, a daily newspaper printed and published in The City of Los Angeles.

I hereby certify that the foregoing ordinance was introduced at the meeting of the Council of the City of Los Angeles of October 29, 1946 and was passed at its meeting of November 6, 1946.

WALTER C. PETERSON, *City Clerk.*

Approved this 8th day of November, 1946.
(File No. 25381.)

FLETCHER BOWRON, *Mayor.*

ELECTRIC RATES—WITHIN CITY OF LOS ANGELES—EFFECTIVE OCTOBER 1, 1951

ORDINANCE NO. 98,410

An ordinance approving rates as modified and fixed by the Department of Water and Power of The City of Los Angeles and to be charged for electrical energy distributed and for service supplied by said Department to customers within the incorporated limits of said City, relating to electrolier lighting service, prescribing the time and the manner of payment of the same, and amending section 5 of ordinance No. 91,100 approved November 8, 1946, relating thereto.

The People of The City of Los Angeles do ordain as follows:

Section 1. That the rates to be charged and collected, and the terms, provisions, and conditions to be effective respecting such rates, for electrical energy distributed and for service supplied by the Department of Water and Power of The City of Los Angeles for electrolier lighting service purposes to customers within the incorporated limits of The City of Los Angeles as heretofore modified and fixed by resolution adopted by the Board of Water and Power Commissioners on the 10th day of July 1951 be and the same are hereby approved.

Section 2. That Section 5 of Ordinance No. 91,100 be and the same is hereby amended to set forth such rates, terms, provisions, and conditions so modified and fixed by said resolution as follows:

"Section 5. That the annual rates to be charged and collected by the Department of Water and Power for furnishing and supplying electrical energy and service for electrolier or other lighting system purposes within The City of Los Angeles, are hereby fixed as follows:

ELECTROLIER LIGHTING SERVICE (SCHEDULE L–4)

Applicability

For service including energy and maintenance, supplied to electrolier or luminaire installations for purposes of street, highway, and traffic safety lighting of thoroughfares (including tunnels, bridges, and parks). The necessary electroliers or fixtures, underground interconnecting conduits and circuits, and luminaires, must be provided by the customer at his own expense. Systems with overhead interconnecting circuits between electrolier posts may be served hereunder, with the customer providing electroliers, fixtures, and luminaires and the Department providing, installing, and maintaining such overhead interconnecting circuits and applying additional charges therefor; when such systems have been acquired by the Department from another utility owning the electroliers and luminaires, service will be provided subject to a further additional charge hereinafter specified covering ownership of such electroliers and luminaires.

RATE "A"—INCANDESCENT LIGHT SERVICE

	Annual charge per light		
	Midnight	1:00 a. m.	All night
Lamp rating (Series Systems):			
800 lumen	$5.76	$5.88	$6.48
1,000 lumen	6.48	6.60	7.32
2,500 lumen	11.40	11.76	12.96
4,000 lumen	15.36	15.84	17.88
6,000 lumen	20.52	21.36	24.60
10,000 lumen	29.64	30.72	36.36
15,000 lumen	39.96	42.12	51.00
25,000 lumen	67.92	71.64	86.40
Lamp rating (Multiple Systems):			
25 watt	2.04	2.28	3.12
40 watt	3.24	3.60	4.92
60 watt	4.80	5.16	6.72
75 watt	6.00	6.36	8.04
100 watt	7.32	7.80	9.72
200 watt	12.36	13.08	16.20
300 watt	17.28	18.36	22.68
500 watt	27.00	28.80	35.64
750 watt	39.12	41.64	51.84
1,000 watt	51.24	54.60	68.04
1,500 watt	75.60	80.64	100.92

RATE "B"—MERCURY VAPOR LIGHT SERVICE

Mercury Vapor Lamp Rating:			
250 watt	$33.00	$34.32	$39.60
400 watt	39.00	40.68	47.16
Additional Annual Charge Per Auxiliary Incandescent Lamp:			
Incandescent Lamp Rating:			
100 watt or 2,500 lumen	9.84	10.08	10.80
200 watt or 4,000 lumen	12.84	13.20	14.52
300 watt or 6,000 lumen	16.80	17.40	19.80

RATE "C"—SODIUM VAPOR LIGHT SERVICE

10,000 lumen	$27.72	$30.36	$40.92

Character of service

Energy will be supplied at service points mutually agreed upon between customers and the Department, for series systems at either 6.6 amperes or 20 amperes, or for multiple systems at either 120 or 120/240 volts.

Maintenance of customers' equipment will be furnished by the Department only insofar as specified hereinafter under "Normal Maintenance."

The Department will provide, install, and maintain overhead interconnecting circuits between electrolier posts accepted for such service subject to conditions and charges hereinafter specified under "Maintenance Other Than Normal"; when such electrolier systems have been acquired by the Department, service will be provided subject to further additional charges and conditions specified under "Maintenance Other Than Normal."

Where service is furnished from overhead lines, the customers may mount cutout boxes on the Department's poles and service connections will be run by the Department to such boxes. The Department will furnish vaults and all necessary appurtenances therein for electrolier lighting service in territories established by the Department as underground areas. Where vault service is furnished, the customer shall install all ducts and conductors between the electroliers or luminaries and the vaults.

All plans and specifications for the installation of, and the construction of, lighting systems shall be subject to approval of the Department, which shall have the right to inspect and to test the installations before accepting for service, and the testing of the original system installation will be made without additional charge for such testing, where it may be done without involving unreasonable time or expense due to faulty construction; provided also that plans for systems where it is contemplated that the Department will furnish installation and maintenance of overhead interconnecting circuits, the electroliers shall be so located that no supports for such overhead wiring other than that afforded by the electroliers will be required except as may be determined by the Department to be reasonably necessary for supplying energy to such systems, or as may be desired for its own purposes.

These and other conditions of service shall be in accordance with Rules and Regulations of the Department.

Determination of billing

The rate for a light operated continuously shall be computed at one and one-half times the "All Night" rate.

The rate for a light controlled on a schedule of operation differing from a standard schedule, except for a light operated continuously, shall be the standard "All Night" rate, increased or decreased as may be appropriate, by 1/5 of the difference between the "All Night" and "Midnight" rates, for each hour of average daily deviation on an annual basis from "Standard All Night Schedule of Operation," computed to the nearest whole cent.

The monthly bill for lights operated on a calendar month basis shall be computed at 1/12 of the applicable annual rates.

Bills rendered for lights in operation for periods other than a full calendar month, shall be computed at 1/360 of the applicable annual rate for each night in operation.

For temporary turn-ons of street lighting at times other than regular scheduled hours of operation, the rate shall be $10.00 per turn-on as a service charge plus 3.5 cents per kwh. In such cases, the kilowatt-hours shall be computed on the basis of the rated demand of the lamps (including the lamp auxiliaries) in operation and the hours of use.

Bills for each calendar month operation of lights shall be payable on or before the tenth day of the following month. Bills for electrolier lighting service supplied at the direction of the Board of Public Works shall be paid monthly by said Board on or before the tenth day of the month for the service so furnished in the preceding month upon demands drawn against the funds provided by the City Council for such purposes.

All bills unpaid 15 days after rendering thereof shall be deemed delinquent and service may be discontinued without further notice.

Operation schedules

Upon acceptance of written application of the customer, lights will be controlled each night in accordance with one of the schedules of operation hereunder:

(a) Standard All-Night Schedule of Operation: During the months of April, May, June, July, August, and September, lights shall be lighted 30 minutes after sunset and extinguished one hour before sunrise, and during the months of October, November, December, January, February, and March, shall be lighted 15 minutes after sunset and extinguished 30 minutes before sunrise.

(b) Standard Midnight Schedule of Operation: Light shall be lighted as provided under "Standard All-Night Schedule of Operation" but shall be extinguished at midnight.

(c) Standard 1:00 A. M. Schedule of Operation: Lights shall be lighted as provided under "Standard All-Night Schedule of Operation" but shall be extinguished at 1:00 A. M.

(d) Special Schedule of Operation: When desired by the customer, service will be furnished to electrolier lighting on a schedule longer than as provided by Standard Schedules of Operation.

When service on a schedule shorter than as provided by "Standard Midnight Schedule of Operation" is requested, and where the nature of the service (as in the case of parks) warrants such special short schedule, the Department may provide service under a suitable schedule of operation as mutually agreed upon by the Department and the customer, but then only if the customer agrees to pay for any extra costs involved in furnishing special switching and other service in connection therewith.

(e) Photo-Electric Controller Operation: In lieu of controlling any lighting operation with reference to "sunset" and "sunrise" in schedules of operation, the Department may, at its discretion, control the lighting and/or extinguishing of lamps by means of photo-electric controllers so arranged as to insure that the lamps will be energized during periods whenever natural daylight values are $^3/_{10}$ of a foot-candle or less on a horizontal plane in open areas.

Normal maintenance

The Department will furnish normal maintenance which shall include periodic inspection, renewal of lamps, cleaning of glassware, replacement of damaged glassware and lamps, maintenance of control, according to established schedules, cleaning and painting of posts, and minor repairs to wiring and electrical appurtenances on or within the posts. Normal maintenance shall not include replacement of damaged glassware or lamps when such damage is coincident with or is a result of partial or total demolition of post or when caused by riots, fires, explosions, earthquakes, disasters of major magnitude, or Acts of God. Normal mainetnance shall not include maintenance with respect to equipment developing defects in test or in service due to faults in design, manufacture, or installation until such defects have been satisfactorily corrected.

Maintenance other than normal

The rates hereinbefore established in this schedule do not provide for maintenance or replacement of customers' equipment other than as specified under "Normal Maintenance." Consequently, the Department may not be required to furnish, at its expense, any other maintenance work, nor replacement of posts or post parts, nor of underground cables or conduits beyond the Department's service feed points. Where the Department has approved the plans for an overhead wired electrolier system, and agreed to provide and install the overhead interconnecting circuits between the electrolier posts, it will provide such installation and maintenance service therefor at an additional annual charge of $3.60 per post; provided that where such overhead wired systems and luminaries are on electroliers which have been acquired by the Department from another utility, service will be provided therefor with a further additional annual charge of $19.08 per post. The foregoing charge relating to the Department's ownership of such electroliers and luminaries is to be made without any obligation or intent on the part of the Department to replace such electroliers at the end of their normal service, life, or when earlier replacement is required for any reason. Any such replacement shall be the responsibility of the street lighting system customer served, and the additional charge relating to the Department's ownership of the electrolier post will no longer be applicable following replacement or removal thereof."

Section 3. That the electric rate schedule, inclusive of terms, provisions, and conditions as provided herein, shall apply to and shall become effective on all regular bills for applicable electrical service rendered on and after the first day of the calendar month next succeeding the effective date of this ordinance.

Section 4. That section 5 of said Ordinance No. 91,100 and all other ordinances or provisions thereof which may be in conflict herewith, are hereby repealed, provided however that the rate schedule, inclusive of terms, provisions, and conditions as contained in said Section 5, shall remain in effect until the rate schedule, inclusive of terms, provisions, and conditions provided for in this ordinance shall have become effective.

Section 5. That the City Clerk shal certify to the passage of this ordinance and shall cause the same to be published once in The Los Angeles Daily Journal and The Los Angeles News, a daily newspaper, printed and published in The City of Los Angeles.

Ihereby certify that the foregoing ordinance was introduced in the meeting of the Council of The City of Los Angeles held August 6, 1951, and was passed at its meeting held August 6, 1951.

WALTER C. PETERSON, *City Clerk,*
By A. M. MORRIS, *Deputy.*

Approved this 10th day of August 1951.

FLETCHER BOWRON, *Mayor.*

COLORADO RIVER STORAGE PROJECT

FRIDAY, MARCH 4, 1955

UNITED STATES SENATE,
SUBCOMMITTEE ON IRRIGATION AND RECLAMATION OF THE
COMMITTEE ON INTERIOR AND INSULAR AFFAIRS,
Washington, D. C.

The subcommittee met at 10 a. m., pursuant to recess, in the committee room, 224 Senate Office Building, Senator Clinton P. Anderson (New Mexico), presiding.

Present: Senators Clinton P. Anderson (New Mexico); Joseph C. O'Mahoney (Wyoming); Alan Bible (Nevada); Eugene D. Millikin (Colorado); Arthur V. Watkins (Utah).

Also present: Senator Thomas H. Kuchel (California); Gordon Allott (Colorado).

Present also: Stewart French, staff director and chief counsel; Goodrich W. Lineweaver, staff member for reclamation; William K. Coburn, staff member for public lands; James Gamble, staff member for Indian affairs; Richard L. Callaghan, chief clerk; N. D. McSherry, assistant chief clerk; and Elmer Bennett, office of legislative counsel, Department of the Interior.

Senator ANDERSON. Mr. Griffith, please. You may proceed, sir.

Senator KUCHEL. Mr. Chairman, I take great pleasure in introducing Hon. Ben P. Griffith, a distinguished citizen of the city of Los Angeles, and presently the president of the board of water and power commissioners of the city.

STATEMENT OF BEN P. GRIFFITH, PRESIDENT OF THE BOARD OF WATER AND POWER COMMISSIONERS OF THE CITY OF LOS ANGELES, CALIF.

Mr. GRIFFITH. My name is Ben P. Griffith, and I am president of the Board of Water and Power Commissioners of the City of Los Angeles. This board consists of five members, appointed by the mayor, with the consent of the city council and is charged with the administration of the water and power department. This department constitutes the largest municipally owned utility in this country. The board members themselves receive no salary, except for a fee of $25 per meeting. Under the charter of the city of Los Angeles, they are clothed with broad powers which make them nearly autonomous, and remove these vital utilities as nearly as possible from political pressures. It is not, and has not been for nearly 30 years supported by taxes but by revenues derived from the rate payers which number some 800,000. As a result, the department has been able to plan for a prudent period ahead of its current needs, and to finance and construct its distribution and storage

facilities in such a manner as to insure against shortages of either power or water.

I might digress a moment there, if I may. I have heard the testimony to date, and the 6 mill figure for Glen Canyon. I want to suggest that we sell our large industrial blocks of power at some 3½ mills in Los Angeles, and as a result I can see no possibility whatsoever, if we were to be considered a purchaser of Glen Canyon power, of buying raw power at 6 mills and subsequently selling it to our customers at 3½.

Senator ANDERSON. I can understand that. At the same time, you can understand that there is a very large installation at Los Alamos, N. Mex., engaged in a very important work that pays 22 mills.

Mr. GRIFFITH. They are, of course, well endowed.

I sketch these points only to justify my presence here, testifying in opposition to Senate bill 500. To be a steward of the water resources of such a city—now some 2,250,000 people, and increasing at the rate of 50,000 per year—is a sobering responsibility, particularly when a great majority of our population is wholly dependent upon imported water. Our people depend upon their representatives to be alert to and vigorous in their defense of every threat to their contractual rights to such water. We are frequently accused of being opposed to every project which would enable our fellow signators to the compact to make beneficial use of their allotted share of the Colorado. This charge we deny, and the records bear us out.

You will later have before you, through Mr. Ely, I believe, a list of many such projects which California has not only failed to resist, but has assisted to passage. One among them is the Colorado-Big Thompson project, which exceeds Hoover Dam in cost. In fact, until 1954, California had never opposed any upper basin project.

Our engineers and attorneys have spelled out the basis of our opposition to this bill. Even to a comparative layman, certain factors emerge clearly from the testimony to date. The Colorado River compact is the fundamental law of the river. It was not entered into hastily. On the contrary, it emerged as the result of years of study and debate, in which each State was represented by its ablest and most experienced advocates.

In its final form it represented solid advantages to every signator. It defined basin allocations and it placed each signator in a position to proceed with such works as were currently feasible. California—again after years of debate and analysis—succeeded in obtaining congressional approval of the Boulder Canyon project. But not, it must be noted, until the city of Los Angeles, through its department of water and power, and other California agencies, had underwritten the entire cost of its construction by obligating itself to purchase the energy generated at such a price as would amortize the Government's investment and pay 4—later reduced to 3—percent interest. To date the power contractors of southern California have returned over $57 million in interest alone on a project whose total cost was some $135 million. Subsequently in 1931, during the depths of the depression, our community obligated itself to the extent of $220 million in bonds, which, through the Metropolitan Water District of Southern California, they devoted to building and paying for Parker Dam and the Colorado River aqueduct. Other installations in southern California bring the total investment to over $500 million.

Please note that the cost of these projects was carried by the beneficiaries. We asked for no subsidy, asked for nothing in fact but the privilege of paying for our benefits. Is it any wonder that we are sensitive to what we consider threats to an adequate use of these installations?

Senator ANDERSON. May I stop you there, Mr. Griffith, and ask you whether it is your belief that the upper Colorado River Basin contracts would be paid for by the beneficiaries?

Mr. GRIFFITH. Not directly.

Senator ANDERSON. You do not believe when a farmer buys the current he is helping to pay for the project? Is that not what happens in Los Angeles?

Mr. GRIFFITH. I was thinking, of course, of the irrigators and the support that will be rendered them by the power purchasers. But to go further I rely, as every layman must, on the advice of engineering counsel and legal consultants, and they say "No."

Senator ANDERSON. Now, a little bit of the water from Hoover Dam gets to irrigators in California. What difference would there be in the position of the irrigators in the Imperial Valley project, as compared with any other project?

Mr. GRIFFITH. Well, Mr. Hewes is president of the irrigation district there, and he will follow me, and he is better qualified to answer that. But I will say that it is my belief that the Imperial Irrigation District has obligated itself for the cost of the improvements necessary for the distribution of its water and is paying that off directly. It is not in any sense directly dependent upon power revenues for the retirement of its obligations.

Senator ANDERSON. The Imperial District is in a little different category. I am not in any way hostile to what was done in Los Angeles. I think they have given a fine example of the large-scale use of Government operation in order to permit the municipality to get its water and power. It is a fine example. But you are doing precisely the same thing there. The beneficiaries are paying for it, and the beneficiaries will pay for all but a tiny fraction of the upper Colorado River Basin project. All but a fraction. To be sure, there is a little wildlife in this and a little bit of sediment control, maybe, but it is very small.

Mr. GRIFFITH. Maybe I was only expanding upon the pride we have in the obligations we have taken upon ourselves.

Senator ANDERSON. You have a right to be proud. It is a fine job. But I mean it is one of the finest examples of how a project of this kind can be constructed, how it involves the consent and cooperation of other States which get no benefit from it. The compact provides that New Mexico shall have a part of that power. How much does it get from Hoover Dam?

Mr. GRIFFITH. As far as I know, none.

Senator ANDERSON. Yet there is a provision that gives us some of the power. Now, we could not use it, because the people would just say, "There it is. You come and get it."

Mr. GRIFFITH. Well, sir, does that not date back to the stand of the Government at the time, which was: We must have a firm guaranty of the power purchases.

Senator ANDERSON. I have not complained about it elsewhere. We are glad that it has been used, and well used, and is being paid off. All we say is: We gave you a chance to do it. Why will you not give us a chance to do it?

You got it first. That is the answer.

Mr. GRIFFITH. No, sir, I would demur on that. As far as I am concerned, any use of that water legally within the compact and feasible to the point of actualization, I am for.

Senator ANDERSON. I am asking you questions I probably should not ask you, because I find myself in agreement with your statement pretty well. All I know from your record is that you are not hostile to this sort of thing. But do you not recognize that there are many of us who are on this bill who want to see the compact observed?

Mr. GRIFFITH. I firmly believe that, sir.

Senator ANDERSON. We are not just a lawless band trying to set the compact aside.

Mr. GRIFFITH. But from my experience and from legal and able counsel, wide variations of the same document can arise.

My only point, which I get to later, is: How can these be resolved? Where can we go to get the resolution of it?

Senator ANDERSON. All right.

Mr. GRIFFITH. Why do we consider this bill a threat? Because our ablest engineering and legal consultants testify as you have heard in this committee, that it constitutes a reinterpretation of the Colorado River compact which is indefensible and which would diminish or nullify our contracts with the Government for our allotment of water. It might be added that the Governor of Colorado has demonstrated in this hearing that he himself apprehends some difficulty in refuting our interpretation of the compact.

As cosignators of a seven-party pact we differ widely as to its terms. As neighbors and fellow westerners, in my opinion, we should seek disinterested assistance. One such aid is readily at hand—the task force on water resources and power—chairmaned by former Gov. Leslie A. Miller, of Wyoming—of the present Hoover Commission. This Commission was unanimously voted into being by Congress, and has been ordered to report on this field not later than May 31 of this year. That we should disregard the voluntary services of these able and busy men would seem to discourage public service of this type to an extreme degree. To reject their findings might be proper, but to ignore them completely seems unforgivable. The last and final court of appeals is also peculiarly available at this time. If the proponents of this bill should see fit to be joined in the case of Arizona versus California in the Supreme Court, many or all of these disputed interpretations of the compact might be resolved.

Thank you very much for the privilege of appearing before you.

Senator ANDERSON. May I just ask a question or two?

You suggest that we might leave this to the Hoover task force, headed by Governor Miller. Are you familiar with the present indictment of this whole project by Governor Miller?

Mr. GRIFFITH. I read his testimony.

Senator ANDERSON. You want to leave it to the fellow you know will kill it?

Mr. GRIFFITH. I do not believe the chairman is the only voice on that committee.

Senator ANDERSON. I think he has been doing a pretty good job thus far.

Mr. GRIFFITH. My belief is that this field was peculiarly designated for their study and general recommendations, and its creation was enthusiastically received by Congress and the country as a whole, based on the need for such an investigation. And it seems to me we are proceeding without some of the advice we might have if we could wait until May and hear their report.

I yield to your point, and I understand your position on it.

Senator ANDERSON. I said facetiously to Senator Goldwater that he could not have his case tried before a more friendly jury than this committee, and I realize that I was merely expressing the fact that many people are inclined, on this committee, to favor the general cause of reclamation. Similarly, we could not put our case before a more unfriendly jury than the Hoover Task Force on Reclamation and Water. They just do not believe in that sort of thing.

Mr. GRIFFITH. I do not believe the Supreme Court has prejudged the matter.

Senator ANDERSON. No.

Mr. GRIFFITH. There is, of course, a decision pending as to whether the upper States shall or shall not join in the action.

Senator ANDERSON. In the matter of the tidelands, they took it away from further court action by an act of Congress. We are not trying to take this away from the court. We are certain that Arizona and California will go along.

Senator KUCHEL. A little different situation, is it not, though, Mr. Chairman?

Senator ANDERSON. Yes; a little different situation. I merely say we are not trying to stop the lawsuit.

You say this constitutes a reinterpretation of the Colorado River compact. Has the contract ever been interpreted by a court?

Mr. GRIFFITH. It has in part, I believe.

Senator ANDERSON. On the points that are involved in this?

Mr. GRIFFITH. My recollection—and once again, I make no pretense of profound legal background on this—is that the Supreme Court at one time did define beneficial consumptive use in the same manner that we do. I would frankly have to check with our counsel on that, but that is my belief.

Senator ANDERSON. I am merely trying to find out what you mean. It seems to me that you mean that we are trying to interpret the compact a little differently from the way Mr. Ely has been interpreting it for a long time.

Mr. GRIFFITH. Well, Mr. Ely has a good deal of concurrence, and it is my belief also.

Senator ANDERSON. Of course, he recognizes that he is on a different side of the fence from some of the rest of us.

Mr. GRIFFITH. Mr. Ely, Mr. Howard, the attorney general of the State, and many others share very generally in this view, and of course I am quite sure that you could say the same for your State, in opposing it.

Senator ANDERSON. Yes; because we feel that a compact to divide water means that it is trying to divide water and not take it all from the upper basin and give it all to California. That is all there is to this controversy.

Mr. GRIFFITH. I could not agree with you more, to this extent: That the compact is the bible. In the final analysis, the terms of that compact will govern the river.

Senator ANDERSON. If one clause says the water shall be divided, and you can read the other clause as saying the water shall not be divided, only the clause that says to you it shall not be divided is the only one there is in the contract.

Mr. GRIFFITH. I take this to be not entirely a dispute about division but a dispute about measurement, the computation of use.

Senator ANDERSON. If all there was was a dispute about measurement, this bill could get through the Congress in a very short time.

Mr. GRIFFITH. I don't mean a dispute about the measurement of how much water is in the river, but how you measure the uses of that water.

Senator ANDERSON. And that is exactly what I was referring to. If there was only this one question of measurement, of how you measure the water, there would not be much argument about it. We would find a way of getting the bill through the Congress pretty quickly.

Mr. GRIFFITH. I recognize that there are others also.

Senator ANDERSON. There are others; you bet. The fundamental question is: Does the water all belong to California, or do the other States have a chance to get a spoonful once in a while?

Senator KUCHEL. With great deference to the chairman, and I say most sincerely what I say now: Is that not the very reason, Mr. Chairman, why all the States involved ought to go on over the across the street to the United States Supreme Court and say, "Here is our problem; you tell us how this compact should be interpreted"? And then the Congress would know exactly what rights each State had with respect to it, and on that basis could prepare legislation that no man could say raised serious legal questions.

Senator ANDERSON. These States all signed the compact once. The purpose of that compact was to try to get us to live together properly. Now, if it becomes absolutely impossible to get along, then it may have to end up somewhere else. But it does seem to me that the welfare of California, occupying the great spot that it does in the West, would be better served if it tried to say, "We are not trying to keep Denver from growing; we are not trying to close the door and put a ceiling on development in the upper basin States."

Senator KUCHEL. California says that, Mr. Chairman.

Senator ANDERSON. It says just the reverse, in my opinion. I think California says, "We want only one theory in this. We want the theory that the upper basin gets only what is left. We are going to get our 7½ million acre-feet regardless of what water is in the river. We are going to get some surplus water, as you call it, out of this, regardless of what is in the river. We are going to see that the Mexican treaty is taken care of regardless of what is in the river. And after all those things are done, if a single spoonful remains and we cannot figure out a legal technicality to get it, you can use it."

Senator KUCHEL. Would my able friend agree that what he is talking about is a question of legal interpretation of the compact?

Senator ANDERSON. No; I do not think it is only that.

Senator KUCHEL. Is it in part that?

Senator ANDERSON. I think there are many compacts entered into among the States, dependent upon the attempt recently to administer

those compacts among the States. We have one over the Pecos River between Texas and New Mexico. We have argued about it a great deal. Texas opposed everything we tried to do for a long time, and then the river ran short of water. Now we realize that regardless of the fact that we are in court, we wish we would get out of court. On this Rio Grande stream that is involved in this, we had a controversy, as you probably recognize, with the State of Texas, for a long time. The State of Texas took the State of New Mexico into court. We thought it was not the best way. We thought there was another way to do it. But they would have us in court. Well, they got us there, and we asserted there were Indians living along the river that had first rights to that water.

Now, Texas wishes we were not in court. Because if the Indians had the first right to that water, New Mexico gets most of it, and Texas owes us 400,000 acre-feet instead of us owing them 400,000 acre-feet.

Mr. GRIFFITH. There are a few Indians in this, too.

I can only personally disclaim any such attitude as you have alluded to, and as far as I know, the responsible leaders of the water agencies in southern California do also. And I still point to the fact that there must be some evidence of good will.

Until 1954, there not only was not a single objection to any use, as I say, including transmountain diversion. It was not until, to our mind—and I know that we would differ on it, but to our mind—the point of a line of toleration, if I might so express it, had been crossed to such a degree as to constitute a real and present threat to what we view as our allocations and rights under the compact. We do this, and again I speak of men such as Mr. Jensen, chairman of the board of the Metropolitan Water District, Mr. Hewes, who is head of the Imperial Irrigation District. Naturally, we do this advisedly, in the sense that we have been advised by the best consultants we can acquire that this is true. Hence, we are here.

Senator ANDERSON. You used the word "threat." How do you use that term? Is it a threat to the possibility that you may some day own all the water in the river, or is it a threat to the use of the water to which the lower basin is entitled?

Mr. GRIFFITH. The latter, sir.

Senator ANDERSON. Then I think you ought to come in here and show how it is a threat to that. Because the diversion of 1,600,000 acre-feet on top of a diversion of 2 million feet does not quite come up to what California itself is entitled to by its own limitation act and far below what California is now using.

Mr. GRIFFITH. Speaking personally, it is not, to my mind, a question of the amount of diversion. It is a question of the manner of operation and the effect of large storage dams, to cite one instance, upon what you might call the management of the river.

We feel that there has not been a comprehensive enough study of the impact upon lower basin uses.

We have tried to spell these concerns of ours out and will continue to do so in later expositions. The objections are sincere and genuine.

Senator ANDERSON. I have only directed these things to you, Mr. Griffith, because I think I know something of your fine reputation as a leader out there in that community.

Mr. GRIFFITH. I think you might agree with me on this: Is this not a foolish place for a dam builder to be, testifying against dams?

Senator ANDERSON. Well, as a good businessman you recognize that what was done in Boulder Dam in the setting up of a district where water could be sold to the municipality and electric current could be developed and sold to that and adjoining municipalities was a very fine deal for the United States Government and for every part of it. Otherwise the water is wasting on down into the gulf and doing nobody any good. We are wasting water today. You people are taking less water than you contracted for. You are in no danger.

And the additional use of this water in the upper basin would not pose the slightest threat to you. It poses a threat for somebody maybe 150 years from now, when there might be a dropping off of water in the Colorado River. But 150 years from now we might have a process for taking salt out of the ocean and supplying you with more water than you ever needed at prices you could afford to pay. We had hoped that somebody would take a view about the situation 75 years from now and would realize that we would need this water in 75 years.

Mr. GRIFFITH. I would say I would be happy if I could view the picture that way.

The State engineer has testified that we are only 7 years away from a shortage of water now. Other figures have extended that to some 25 years. I mean, they say that is the period in which the Coastal Plain will need supplemental water beyond that for which we have contracted.

Senator ANDERSON. You mean within 7 years you may start to propose to use the water?

Mr. GRIFFITH. Bear in mind that I think that is an extreme estimate. I will put it this way. I personally do not agree with it. But I do not have the background to entitle me to disagree in some ways. But we will put it at 25 years that supplemental water will have to be introduced into southern California.

Senator ANDERSON. You do not have faith that in 25 years salt water will be available?

Mr. GRIFFITH. I do not, sir. I wish I did. And we have tried to keep abreast of that development.

Senator ANDERSON. If the United States Government will put some real money into it, it would be available. But if the United States Government acts as it did in the coal-mining areas around Rifle, and as soon as it got to the point where gasoline could be distilled out of that coal at about 30 percent of the price of the ordinary gasoline, they closed the plant down. That is getting it down pretty far.

Mr. GRIFFITH. But we cannot gamble with the thirst of our citizens. I will put it that way. It may well emerge in time, although I have talked with people who say that the United States will never be able to afford to use an ounce of uranium to boil water for that purpose, because of its need for other purposes.

Senator ANDERSON. I did not talk about the use of uranium.

Mr. GRIFFITH. I thought you were talking about the fissionable approach.

Senator ANDERSON. Oh, no. When cheap power comes, it may not come from uranium. But just taking the present knowledge we have of coal, we are not extremely far from the utilization of sea water now.

Mr. GRIFFITH. Why do you not utilize it up in the upper basin?

Senator ANDERSON. We do not have an ocean right close to us. You have got one at your door.

Mr. GRIFFITH. Yes, more salt water than fresh.

Senator KUCHEL. Mr. Griffith, you have suggested, in your statement, and I quote this sentence:

> If the proponents of this bill should see fit to be joined in the case of *Arizona v. California* in the Supreme Court, many or all of these disputed interpretations of the compact might be resolved.

You have read the hearings on types of legislation similar to S. 500 which have been held in past sessions. You have attended the hearings this week on S. 500. Just to pick out one example of the legal questions raised, you have heard and read the divergent views which are held by governmental agencies with respect to where Indian rights come into this question. The Department of Interior has taken a position. The Department of Justice has taken a position. Testimony by able lawyers before the Senate Committee on Interior has taken divergent positions. And that constitutes one example of the type of legal question that will have a direct bearing on the water which is available under the Colorado River compact and the water that would be available under a bill such as S. 500. No question about that; is there?

Mr. GRIFFITH. Not a bit, to my mind.

Senator KUCHEL. And there is only one place to resolve a legal controversy between good faith disputants and that is over across the street in the United States Supreme Court. We can argue as long as we want to around this table. We can listen to the distinguished Governor of Colorado from the upper basin testify that in his opinion the legal conclusions that have been reached by people in the lower basin are correct. And your statement here would seem to indicate the only fair and reasonable basis upon which to resolve the controversies that are not going to be solved if a bill similar to S. 500 were to be enacted into law.

There is only one way to eliminate the dispute, there is only one manner to find out which States are right and which States are wrong, and that is not in a committee of Congress or in the Congress of the United States. It is in the court.

And I think you are eminently right in suggesting that as a powerful argument against a premature determination by the Congress of an upper Colorado River storage project in the absence of knowing just where the rights to the water are vested from a legal standpoint, and I think that the statement you made ought to be repeated again and again, because there you have an opportunity for every State that is involved to find, once and for all, what it is entitled to and what the other States are not entitled to.

Senator ANDERSON. May I just point out: Not being a lawyer, as I said the other day, it is very easy to give legal opinions of you are not a lawyer. You have nothing to restrain you. But I remember very distinctly the long hearings we held in a project in which California made the same suggestion it now makes.

"Go over to the court and find out." The point is that there was no justiciable issue and there is none in this.

If this bill were to be passed and California then thought that it represented any danger whatever to its water supply, it could then take us into the Supreme Court.

So why do you not let the bill pass and then show how we are going into the Supreme Court? You want to get there so quickly. That

is the best way to get there I know. We will help you get there. You just get this bill passed.

Mr. GRIFFITH. Because, Senator, it seems to me uneconomic, at least. Here we have, as I recite it, a matter where it is not a question of starting a suit, going through the years of preliminary briefs and those things necessary to reach the actual decision. We have an action in being—a decision that can be expected within a reasonable time. I will put it that way. This is horseback, as you, of course, can understand. If this bill should go through, embracing features which we feel call for legal interpretation, and we go to court, there is litigation for 3 or 4 years after its passage. The Supreme Court has decided there is justiciable issue between Arizona and California. It involves a great many, if not all, of these interpretations implicit in this bill.

Senator KUCHEL. Of the compact?

Mr. GRIFFITH. Of the Colorado River compact.

Senator ANDERSON. I could not disagree with you more, but go ahead.

I do not know the law in it, but I do not think you will find the things there that you have complained about in connection with this contract.

Mr. GRIFFITH. I think it would be a very useful thing for all the States to have a final and conclusive interpretation of that compact to the extent that the issues are embraced in the Arizona-California suit.

Senator KUCHEL. I think it was Mr. Ely who suggested that if you are going to pass legislation to divide up a pie, you ought to know the size of the pie first, and the only way to do that is through a Supreme Court decision. Is not that the fact?

Mr. GRIFFITH. That sounds logical to me.

Senator ANDERSON. But we in the upper basin States are not looking for pie. We are just looking for bread and butter.

Senator KUCHEL. The size of the loaf would be important.

Mr. GRIFFITH. I might point out that the benefits of this spread over population numbers that we have comes to a comparatively small sum per person, and to that extent we are the poor folks here.

Mr. Chairman, I thank you and your committee for the courtesy of hearing me.

Senator ANDERSON. Thank you.

That was a good statement. We are glad to have had you.

Senator KUCHEL. Mr. Chairman, the next witness to appear will be Mr. Raymond Matthew, the chief engineer of the Colorado River Board of California. Mr. Matthew has been employed in his professional capacity with the Colorado River Board for a great many years, and thus is intimately acquainted with the problems involved in the pending legislation.

STATEMENT OF RAYMOND MATTHEW, CHIEF ENGINEER, COLORADO RIVER BOARD OF CALIFORNIA

Mr. MATTHEW. Mr. Chairman, my name is Raymond Matthew. I am chief engineer of the Colorado River Board of California. I appear here on behalf of the Colorado River Board of California, which is a State agency created by act of the legislature in 1937. The board is charged with the responsibility for protecting the interests

of California in the waters of the Colorado River. It is composed of 6 members appointed by the Governor, each representing 1 of the public agencies having established rights to the use of water or power from the Colorado River.

California agencies have rights established by prior appropriation and by contract with the Secretary of the Interior under the authority of the Boulder Canyon Project Act, providing for the use in California of 5,362,000 acre-feet annually of water from the Colorado River system. It is the duty of the State to protect and preserve those rights of its citizens.

California, in the protection of its investment of over three-quarters of a billion dollars in water-development projects which it has made in reliance upon the Colorado River compact and the Boulder Canyon Project Act, and the economy and welfare of about 6 million people dependent upon these works, must resist legislation which would encroach upon the rights recognized in the lower basin States by those documents.

The Colorado River Board of California opposes the enactment of S. 500 to authorize the Colorado River storage projects and participating projects, for the following reasons:

1. The plans for construction and operation of the projects as proposed in the bill and set forth in the reports of the Bureau of Reclamation would adversely affect to a material extent the rights of California agencies to Colorado River water, which have been established by prior appropriation and by contract with the Secretary of of the Interior under the Boulder Canyon Project Act.

2. The feasibility standards and the financial plan proposed for the developments depart materially from existing reclamation law of geenral application, and are unsound from the standpoint of national public interest.

3. The authorization of the projects proposed in the bill is premature at this time, because the investigations and studies with respect to engineering feasibility, economic justification and financial soundness of the proposed developments are inadequate and incomplete in many important particulars, and moreover, the administration and operation of the projects proposed for authorization involve fundamental legal questions as to water rights that are now at issue before the United States Supreme Court in *Arizona* v. *California et al.*, and will be governed by the decision in that case.

Water supply and use: It appears that the proposed upper basin developments have been planned with little if any regard for the rights and interests of the lower basin. The engineering studies of water supply and use presented in the project planning report involve or imply what are considered to be erroneous interpretations of the Colorado River compact, and do not clearly show what the effect of the proposed developments will be on the water supply and operations in the lower basin. The studies are directed almost entirely to estimates of the flow of the Colorado River at Lee Ferry and depletion of that flow by upstream use.

The erroneous interpretations of the compact include: (1) that article III (a) apportions to the upper basin a water use of 7,500,000 acre-feet a year in terms of depletion of the virgin flow at Lee Ferry instead of a beneficial consumptive use of 7,500,000 acre-feet a year at places of use.

Senator ANDERSON. Actually, the wording of the compact is plain as to beneficial consumptive use, is it not?

Mr. MATTHEWS. We think it is, yes.

Senator ANDERSON. That is the wording of the compact.

Mr. MATTHEWS. Yes, beneficial consumptive use.

Senator ANDERSON. It is your contention we are trying to ignore that wording?

Mr. MATTHEWS. Our contention is, in this, number one, that you are attempting to make an interpretation on the measurement of beneficial consumptive use which is not in accord with the accepted definitions from a technical standpoint or a legal standpoint.

Senator ANDERSON. Then the argument is over which definition of beneficial consumptive use is going to be used.

Mr. MATTHEWS. That is right.

Senator ANDERSON. Yes. It is not that we are trying to use it on the basis of depletion of flow.

Mr. MATTHEWS. Continuing in regard to erroneous interpretations: (2) that the upper basin would be entitled to the consumptive use of an average annual amount of 7,500,000 acre-feet of apportioned water instead of a maximum of 7,500,000 acre-feet in any one year. Coupled with the foregoing, the assumption is made that the irrigation water requirement would be highest in wet years and lowest in dry years, which constitutes an unreasonable and illogical premise.

Senator ANDERSON. Excuse me right there.

Do you think the upper basin would be satisfied if we did have an average annual guaranty of 7½ million acre-feet of water?

Mr. MATTHEWS. Our contention is that the maximum that the compact provides for the upper basin in perpetuity is 7,500,000 acre-feet in any one year.

Senator ANDERSON. And do I understand that you would not be opposed to projects if all they did was provide for a maximum use of 7½ million acre-feet in any one year?

Mr. MATTHEW. We have recognized that as being the intent of the compact.

Senator ANDERSON. And this only provides for 1,800,000 acre-feet, so it is well within the 7½ million acre-feet that you are glad for us to have?

Mr. MATTHEW. Yes; that is right. But the plan of construction and operation, which the proposed development is predicated on, is based upon using an average of over a number of years, rather than a maximum in any 1 year of 7,500,000.

Senator ANDERSON. And if we put a rider on, saying the maximum in any 1 year should be 7½ million acre-feet, then your objections to the bill would disappear?

Mr. MATTHEW. That would be helpful in that one particular, yes.

Furthermore, the Bureau appears to assume, insofar as the lower basin is concerned, that the storage reservoirs could and would be operated primarily to satisfy the obligation under article III (d) of the Colorado River compact, which requires that the flow at Lee Ferry shall not be reduced below 75 million acre-feet in any consecutive 10 years. This apparently reflects the general view of representatives of the upper basin States that the only obligation of the upper basin to the lower basin under the compact is that re-

quired by Article III (d). This view is based upon a misconception of the compact.

The lower basin States are entitled to receive at Lee Ferry all waters of the Colorado River system over and above the amount put to beneficial consumptive use up to the compact apportionment of 7,500,000 acre-feet maximum in any 1 year in the upper basin. Estimates of available water supply for the lower basin have been predicated upon this basis, indicating an expectation of an average annual water supply at Lee Ferry of about 8.5 million acre-feet, after full use of apportioned water in the upper basin. Rights thereto long since have been established by appropriation and by contract in the lower basin.

The indicated combined effect of assumptions predicated upon erroneous interpretations of the compact, on which the Bureau's engineering studies of water supply and use and reservoir operation are based, would be to reduce the water supply which the lower basin States expect and are entitled to receive at Lee Ferry under the compact, by about 1,500,000 acre-feet as a long time average.

Quality of water: The effect of proposed developments in the upper basin on quality of water available to the lower basin is of equal concern to quantity. The project planning report contains no information concerning the present or future quality of water delivered to the lower basin at Lee Ferry. According to testimony presented at hearings, however, the Bureau of Reclamation estimates that the average salt content of Colorado River water at Lee Ferry would be increased about 12 percent by the projects included in the pending bill; and that the average salt content at Lee Ferry, under full use of water apportioned to the upper basin, based upon a preliminary study, would be about 1.2 tons per acre-foot (880 pounds per minute) or 54 percent greater than the present prevailing salinity.

Considering that the corresponding salinity in the lower Colorado River would be 25 to 30 percent greater, approaching a salt concentration that would make the water supply of questionable quality for irrigation, this preliminary study points up the seriousness of this problem. It appears to have been overlooked in the Reclamation Bureau's planning in the past, but can be no longer ignored.

It is the position of the Colorado River Board of California that the Colorado River compact intends that water available for use in the lower basin shall be suitable in quality for all necessary purposes. This is required by article VIII of the compact, which provides:

> **Present perfected rights to the beneficial use of waters of the Colorado River system are unimpaired by this compact.**

Certainly this means unimpaired as to quality as well as quantity.

It is evident that increased consumptive use of the waters of the Colorado River and its tributaries in the upper basin, particularly the relatively pure water flowing in the headwater streams, will result in a higher concentration of mineral salts in the residual flow in the lower reaches of the river downstream. This would be particularly true of transmountain diversion projects, such as the central Utah and the San Juan Chama projects proposed in the pending bill, for which the water for export will be diverted at higher altitudes where the streamflow is much better in quality than that in the lower parts of the system.

Therefore, it is further the Board's position that no additional transmountain diversion projects should be authorized in the upper basin until an authoritative determination is made regarding the entire matter of quality of water and satisfactory evidence is furnished that there will be no harmful effect on the water supply available for use in the lower basin.

Senator ANDERSON. Does this apply to the Arkansas-Fryingpay project as well?

Mr. MATTHEW. Yes, sir.

Senator ANDERSON. You are opposed to that bill also?

Mr. MATTHEW. Yes; the Board has opposed that bill also, particularly because it is the forerunner of a much large project of the same character which would be much more effective.

Senator ANDERSON. And we had a little project mentioned the other day, the Goosberry project. You are opposed to that as well?

Mr. MATTHEW. That is not particularly a transmountain diversion project.

Senator ANDERSON. I do not undestand the word "particularly." It either is, or it is not.

Mr. MATTHEW. Well, it is an inbasin project, as I recollect, but it has been several years since I looked at the report.

Effect of upper basin project operations on lower basin: The Bureau's Project Planning Report of December 1950 contains only brief and vague allusions to the lower basin, and to the possible effects of the plan of operation of the proposed reservoirs upon the available water supply and the operations of the reservoirs and powerplants in the lower basin.

Senator ANDERSON. May I just pause there to say, because it is in my mind, that the hearing on the Arkansas-Fryingpan project is scheduled to start about the 16th of March, so that you may have a chance to come in with any representations against it. It passed the Senate on the Consent Calendar the last time.

Mr. MATTHEW. Yes, sir; I know that is true.

Senator ANDERSON. Thank you.

Mr. MATTHEW. Thank you for that information, Mr. Chairman.

It is evident that the filling of the 10 reservoirs as proposed in the Bureau's report, with an ultimate capacity of about 48 million acre-feet, would have a material effect upon the lower basin facilities and operations. Even the filling of the 6 reservoirs proposed in the bill S. 500, for initial authorization with the combined capacity of about 44 million acre-feet would have a material effect and would present serious problems.

During the assumed 20-year reservoir filling period, at least 48,555,000 acre-feet of water in addition to reservoir evaporation losses estimated at 9,730,000 acre-feet, or a total of about 58,290,000 acre-feet, would not be available during that period for the production of power at lower basin installations or to meet consumptive use requirements and the Mexican Treaty obligation.

The 58,290,000 acre-feet retained or lost in upper basin reservoirs would amount to an average of more than 2,900,000 acre-feet a year for 20 years. On the basis of the average effective heads at the lower basin power projects and assuming overall efficiencies of 80 percent, it is estimated that the reduction in electrical energy production at

the lower basin plants, that would be caused by retention of that volume of water in the upper basin, would aggregate 62.4 billion kilowatt-hours. Assuming that such a potential loss of output would be valued at only 3 mills a kilowatt-hour, the total loss involved to the Government would be about $187 million.

This potential loss in lower basin power output and revenues is significant and should be evaluated and taken into account in any appraisal of benefits and costs and financial aspects of the upper basin project. That has not been done.

In addition, the lower basin would be materially affected by the apparent assumption in the Bureau's studies of upper basin operations that the only obligation required to be met at Lee Ferry would be the delivery of 75 million acre-feet in any consecutive 10-year period. If during the filling period of upper basin reservoirs or during subsequent operation, the flow were to be reduced at Lee Ferry to an average of 7,500,000 acre-feet annually for several years, the firm power output at Hoover Dam would be reduced about 25 percent, and there would be no secondary power. The output of other downstream powerplants would also be reduced similarly.

It does not appear that proper consideration has been given to this situation which involves contractual obligations with power users throughout the lower basin States—not only California but also Arizona and Nevada—who are depending on obtaining full power output from these lower basin plants to meet their power demands and financial obligations. Nor has consideration been given to the resulting financial loss to the Federal Government and local agencies concerned.

Senator ANDERSON. May I stop you there to ask: Since this has been dealing with Hoover Dam, is it or is it not a fact that the Hoover Dam contracts are all set up on a basis of gradual reduction of power quantities dependent upon the development of the upper basin?

Mr. MATTHEW. That is correct.

Senator ANDERSON. Then why should you suddenly complain about it now, if what you anticipated takes place?

Mr. MATTHEW. Well, this is far more than was anticipated. The firm power is defined in the contracts starting with 4,330 million kilowatt-hours a year, reduced by 8,760,000 kilowatt-hours a year, due to depletions in the upper basin.

Senator ANDERSON. Would the projects involved in this bill reduce it more than that?

Mr. MATTHEW. Yes, these storage projects would. Because under the plan of operation set up in the Bureau's report, the intent would be to deliver only 7,500,000 acre-feet. Now, the way it works out, the firm power output at Hoover Dam over the 50-year period ranges from about 4,330 million kilowatt-hours down to something less than 4 billion in the 50-year period. To generate that firm power output requires something in the neighborhood of 10 million acre-feet a year. Now, then, if you reduce the flow at Lee Ferry to 7,500,000, that would reduce the firm power output at Hoover Dam in the contract period by 25 percent.

Senator ANDERSON. But, surely, you would not contend that it was anticipated that the flow at Lee Ferry should be above 7½ million acre-feet, and keep Hoover Dam going to capacity?

Mr. MATTHEW. Not just necessarily for that. I am merely pointing out that under the contracts as set up, in order to deliver that firm power at Hoover, it would require the larger quantity. And if there was only 7,500,000 acre-feet at Lee Ferry, then the firm power output would be reduced 25 percent, and they would not get any secondary.

Senator ANDERSON. I am trying to get down to bedrock, but you insist on these interpretations of the contracts requiring the delivery of 7½ million acre-feet at Lee Ferry. Now, if we live up to that part of the compact, and that results in any cutting down at Hoover Dam, do you think that is wrong?

Mr. MATTHEW. Yes, we do.

Senator ANDERSON. You do. Therefore the Hoover Dam situation is more important than that section of the compact?

Mr. MATTHEW. Not just that. But we feel that we are entitled to receive at Lee Ferry all the water not consumptively used for irrigation and domestic consumptive use in the upper basin.

Senator ANDERSON. How about section 6 of the act, which says the hydroelectric power acts authorized by this act to be constructed, operated, and maintained by the Secretary shall be operated in conjunction with other Federal powerplants present and potential so as to produce the greatest practical amount of power and energy that can be sold as firm power and energy rates. And this language—

but no exercise of the authority hereby granted shall affect or interfere with the operation of any provision of the Colorado River compact, the upper Colorado River Basin compact, or the Boulder Canyon Project Act.

Does that give you any protection?

Mr. MATTHEW. Well, it would seem to, yes. I am pointing out, Senator, that the plan of development of the storage projects as set forth in the Bureau's official report is predicated upon an interpretation of the compact which we do not concur in.

Senator ANDERSON. Then your objection is not to the bill but to some calculation that has been made by the Bureau of Reclamation.

Mr. MATTHEW. That is right. And that is the basic information about this project.

Senator ANDERSON. Then we will let the bill go through and get passed, and you can struggle with the Bureau of Reclamation afterward?

Mr. MATTHEW. No, because we think, Senator, that the official report of the Bureau on this project is the only source of basic information as to what is talked about in the bill.

Senator ANDERSON. But I thought the reports were so inconclusive that you could not tell.

Mr. MATTHEW. Oh, they are very definite as to what was intended in this regard, and that is what we are objecting to.

Senator WATKINS. May I ask you a question? I think you stated that the Government stood to lose a lot of money in connection with this operation if this project is built.

Mr. MATTHEW. Yes.

Senator WATKINS. You mean they lose the cost, do not get back all the cost, of the Hoover Dam?

Mr. MATTHEW. It might not mean that they would not get back the cost finally, but it might be long delayed.

Senator WATKINS. But it bears interest; does it not?

Mr. MATTHEW. Yes, it certainly does.

Senator WATKINS. Then how can the Government lose?

Mr. MATTHEW. Well, this water, most of it, or a large part of it, will be retained and never available to develop that power. So it is a distinct loss.

Senator WATKINS. Well, the Government does not have any right to the water at all, does it, as a matter of fact? This water has been allocated between the two basins, and the United States has not reserved anything except the water for Mexico and for the Indians. Is that not right?

Mr. MATTHEW. I am not talking about the right of the Government to the water, but the loss of revenue. They have powerplants there and a big investment in which they are depending upon power revenues to help pay it back.

Senator WATKINS. You think they did not know what they were doing when they planned this sort of a program?

Mr. MATTHEW. I think that the upper basin project has been planned, not intentionally, in a kind of a vacuum, without regard for the lower basin interests.

Senator WATKINS. I am just wondering how they can lose when, as a matter of fact, they have been getting the benefit of a gift, in effect, from the upper basin States all these years in the way of secondary power, and, of course, firm power, much more of it than you could ordinarily guarantee unless you counted on having the water from the upper basin States run there personally.

Senator ANDERSON. That is the loss, Senator. The loss he is talking about is a loss that they would obtain if somebody stopped all the water in the Colorado River Basin from flowing down there.

Senator WATKINS. If we stop giving our water to them.

Senator ANDERON. Yes. That is the loss.

Senator WATKINS. I have had people make gifts to me once in a while, and if they stop giving me those gifts I have lost.

Mr. MATTHEW. As was testified to yesterday by Mr. Tillman, of course that secondary power and firm power was not guaranteed.

Senator WATKINS. It was not. That is true.

Mr. MATTHEW. The point I am making here is that the financial losses should be taken into account in the economic and financial studies of the upper basin project.

Senator WATKINS. You think there will not be any gains by building the upper basin project, to the Government?

Mr. MATTHEW. Not to the Nation, no.

Senator WATKINS. Not to the Nation as a whole?

Mr. MATTHEW. No.

Senator WATKINS. But there were gains to the Nation as a whole when they built the lower basin project?

Mr. MATTHEW. But the point is——

Senator WATKINS. Can you answer that?

Mr. MATTHEW. Of course there were.

Senator WATKINS. All right. There would be the same kind of gains upstream, not quite as many, because it would be a more difficult job to do.

How would you suggest that the upper basin fill its reservoirs, if it sends all the water except that which it consumes downstream each year?

Mr. MATTHEW. Well, the upper basin reservoirs would have to be filled during periods in which there were wet years, large runoffs.

Senator WATKINS. That is one of the plans they have in mind. That is in the report, too, is it not?

Mr. MATTHEW. That is right.

Senator WATKINS. So it is not altogether negative.

Mr. MATTHEW. Not altogether. But, nevertheless, what I state in here is true of their study, the study the Bureau made. And that is that it is predicated upon the theory that the only obligation is to deliver the 75 million acre-feet.

Senator WATKINS. We are obligated not to deplete it by any action on our part.

Mr. MATTHEW. That is right.

Senator WATKINS. And, of course, you heard the testimony of the witnesses for the Bureau the other day, in which they indicated very clearly that under their studies they would be able to make your water supply more firm, and it would really be of benefit to you.

Mr. MATTHEW. Well, that remains to be seen.

Senator WATKINS. Of course, anything that is to happen in the future remains to be seen.

Mr. MATTHEW. I have seen no studies as yet to demonstrate that, Senator.

Senator WATKINS. Is it worth anything to the Government to have its Hoover Dam life extended some 200, 300, or maybe 500 years, as Governor Johnson said the other day?

Mr. MATTHEW. I presume it would.

Senator WATKINS. It would be almost worth the entire cost of the project, would it not? Because if you do not extend it, you stand to lose it; and if you extend it, you double the life of the project.

Mr. MATTHEW. As far as what we are talking about is concerned, the life of Lake Mead is 3 or 4 times the length of these power contracts that we are talking about.

Senator WATKINS. You are talking about the Government losing the money. If it gets the project restored as good as new by reason of the other project being built, I fail to see where it is going to lose money.

Senator ANDERSON. Is it California's position that the upper basin should not be permitted to build storage to protect the user against closing down of the projects during the drought years?

Mr. MATTHEW. No, sir; it is not. I will make the thing clear as I go along. We do not feel that those reservoirs should be built in advance of the need for that purpose because of the large evaporation losses which would be an uneconomic waste of water in the meantime.

Senator ANDERSON. I stopped you a minute ago about this trans-mountain diversion.

You recognize one of the awful things in this world is to have a memory that runs back a ways. I attended the Frying Pan-Arkansas hearing in 1953. Did you testify on the bill?

Mr. MATTHEW. Yes, sir.

Senator ANDERSON. Did you testify in favor of the bill?

Mr. MATTHEW. We did not testify against it.

Senator ANDERSON. How could you testify and not testify in favor of it if you did not oppose it?

Mr. MATTHEW. We pointed out a number of——

Senator ANDERSON. Minor amendments?

Mr. MATTHEW. Well, they weren't minor. They were very important.

Senator ANDERSON. But you are now opposed when it comes to the San Juan transmountain diversion; you are opposed to the idea of taking water out of the basin. Did you take that position in the hearing?

Mt. MATTHEW. Yes, sir.

Senator ANDERSON. In 1953?

Mr. MATTHEW. That is right.

Senator ANDERSON. Then you did completely oppose the Colorado's Frying Pan-Arkansas project?

Mr. MATTHEW. We pointed out our concern about transmountain diversions at that time.

Senator ANDERSON. I do not think you follow me. If you are opposed to transmountain diversions of any kind, you are opposed to them.

Now, did you oppose the Colorado Frying Pan-Arkansas project?

Mr. MATTHEW. Not as such at that time.

Senator ANDERSON. So you do not oppose that.

Mr. MATTHEW. But the situation has changed very materially since then.

Senator ANDERSON. Yes, it is from a different State.

Mr. MATTHEW. Now, we have this gigantic upper basin project which proposes up to 3 million acre-feet of transmountain diversion. That is something to think about.

Senator ANDERSON. The Gooseberry project you referred to you said was a within-basin project?

Mr. MATTHEW. Yes.

Senator ANDERSON. Not being an engineer I do not recognize the niceties there.

It provides for transfer outside the basin of about 12,500 acre-feet of water.

Mr. MATTHEW. I don't think that is correct.

Senator ANDERSON. You do not think it is correct?

Mr. MATTHEW. No; I don't think so.

Senator ANDERSON. How about that, Mr. Larson? Does the Gooseberry project permit the exportation from the Colorado River Basin of 12,500 acre-feet?

Mr. LARSON. That is correct.

Mr. MATTHEW. If that is correct, I change my statement. I was thinking of another Utah project.

Senator ANDERSON. You are opposed to that?

Mr. MATTHEW. That is right.

Senator ANDERSON. Does not southern California take some water over the mountains from the Colorado River to Los Angeles?

Mr. MATTHEW. That is correct.

Senator ANDERSON. That is transmountain diversion?

Mr. MATTHEW. Yes.

Senator ANDERSON. You are not opposed to that?

Mr. MATTHEW. No.

Senator ANDERSON. In other words, it depends on which State it is in. You are not opposed to them in principle?

Mr. MATTHEW. Mr. Chairman, we are here to try to protect California's rights to Colorado River water, which we believe are just and legal, and which we are entitled to.

Senator ANDERSON. Now, two States got in the compact. I will use my State and your State merely for comparison purposes.

You had the chance to get the water from the Colorado River in California and put it on those parts of California that were on the east side of whatever mountain ranges there might be.

California chose instead to use its water in and around Los Angeles and took it by transmountain diversion to that side. That, you say, is all right.

New Mexico chose to take its water and put a portion of it, a tiny portion of it, not nearly the proportion that California expects to do, a tiny portion of it, 50,000 acre-feet, over a little range of mountains and over into the Rio Grande Valley.

That, you say, is wrong. Can you tell me on principle what the difference is between them.

Mr. MATTHEW. Yes; because we believe that California's rights are prior to the rights in the upper basin.

Senator ANDERSON. Even though the Indians were using water for three or four hundred years. You mean that California has rights that are prior to the rights of the upper basin?

Mr. MATTHEW. Yes.

Senator ANDERSON. On what basis? How did Los Angeles get these rights prior to the upper basin when they were not putting the water to beneficial use?

Mr. MATTHEW. They started their appropriations in the early twenties.

Senator ANDERSON. Then if you come in early and have the first development, even though you have a compact that says you shall both develop, the man that develops first has the prior right?

Mr. MATTHEW. Yes; the compact provides for preserving those rights unimpaired.

Senator WATKINS. Did you have any priorities initiated for the Los Angeles in the metropolitan area prior to the building of the Hoover Dam?

Mr. MATTHEW. Yes.

Senator WATKINS. How much water had you ever taken out of the Colorado prior to that time?

Mr. MATTHEW. The appropriations were initiated in the early twenties.

Senator WATKINS. They were placed on substantially the same priority when they were recognized in the compact itself.

In other words, in order to get the Boulder Canyon Act passed, that project, Hoover Dam constructed, you had to agree with the upper basin States, you had to enter into a compact; did you not?

Mr. MATTHEW. That is right.

Senator WATKINS. You mean to say that in that you get a right to transfer it over the mountains into other areas, other watersheds, but the upper basin States cannot use that water that way.

In other words, you decide how you are going to use your water, but they cannot decide how they are going to use it?

Mr. MATTHEW. It is not so much a question of the transmountain diversion of water to the metropolitan areas, as it is the early rights of the irrigation areas.

Senator ANDERSON. Now, you are very anxious to observe the compact on most things, but on this particular issue you say we want to abandon the compact and go to the theory of the prior rights.

The compact was supposed to set aside the theory of the prior rights. I asked you why did not Mexico have as much right to use it as California, and you say you rely on the theory of prior rights.

Mr. MATTHEW. Yes; because the compact protects those prior rights.

Senator ANDERSON. I am glad you are getting counsel on this point.

Mr. MATTHEW. I was about to come to it anyway because these legal questions can be much better discussed by our legal counsel.

Senator ANDERSON. I was merely trying to establish the fact that a transmountain diversion is all right if California does it. It is tentatively right if Colorado does it, because you are in favor of the bill here and against the bill in the House, but it is all wrong if New Mexico or Utah do it.

Mr. MATTHEW. I say again all we are trying to do is protect our rights.

Continuing with my prepared statement: Furthermore, if under such assumed operation water were used or withheld in the upper basin in excess of the apportionment of 7,500,000 acre-feet for consumptive use in any one year, such would be surplus water under the compact, to which rights and obligations are now attached in the lower basin and for Mexico under the Mexican water treaty.

It does not appear that proper consideration has been given to these established rights and obligations for surplus water in the lower basin.

Economic and financial aspects: The Colorado River storage project appears to be basically a hydroelectric project. The only showing of economic justification in the Bureau report is based solely on power revenues.

Considered in this light, the financial feasibility of the storage project appears open to question for several reasons. Repayment of the reimbursable construction costs within the periods and at the power rates proposed would depend entirely upon:

1. Allocation of a large portion of the construction costs to irrigation on an interest-free basis;

2. Postponement of the starting of repayment of the irrigation allocation for about 50 years; and

3. Subsidization of the more costly power units with surplus power revenues earned by the least costly Glen Canyon power unit.

No clear and adequate justification is shown in support of the allocation of a large part of the cost of the dams included in the storage project to irrigation. Justification for such allocation to irrigation would apparently depend upon the future authorization of projects for consumptive use of water in the upper basin.

Only minor use could be made of the regulatory reservoirs of the storage project directly for water-consuming projects. Future irrigation projects, as a rule, would require individual storage facilities.

The one reason given for the proposed allocation to irrigation on the storage project is that the storage units would provide holdover

capacity so that the upper basin can proceed with the development and use of water without violating the Colorado River compact.

Information in the basic report shows that at the present and anticipated future rate of the upper basin development, Glen Canyon Reservoir alone would suffice for this purpose for 40 to 50 years hence.

Furthermore, the additional consumptive use estimated for the participating reclamation projects proposed for initial authorization in the bill, S. 500, could be made even without Glen Canyon Reservoir.

None of the power dams proposed for initial authorization in the bill S. 500 would be needed or used to supply water for the 14 new participating projects proposed. Their only function for many years to come would be the generation of hydroelectric power.

Although it appears there would be a market for the power produced, the market demands could be served from other sources as cheaply as the proposed selling price of 6 mills per kilowatt-hour, and there would be no special incentive to purchase the power at this price. Hence, there is no assurance that the hydropower produced could or would be sold at 6 mills, as estimated by the Bureau.

Senator WATKINS. You have no confidence in the statement made by the public utilities of the upper basin States which has been placed in the record indicating that they will take all the power that can be produced and generated under this upper-basin program?

Mr. MATTHEW. Yes, I have, Senator; but as far as I know, they have never stated what they would be willing to pay for the power.

Of course, they also testified in their same statements that there was no power shortage up there as far as they were concerned. They had an abundance of fuel and so on that they could build thermal plants and were building thermal plants to generate power to meet the market demands.

Senator WATKINS. They did state there was a shortage of water that had to be present in order to have any additional increase in use of power, did they not?

Mr. MATTHEW. I don't recall that, Senator.

Senator WATKINS. Mr. Moffat, I think, made it very clear that the water was absolutely necessary, more of it, before they could use power. You could furnish all the power possible to produce in that area and if they did not have any water, it would not be of any use to them, because they have to have water to get along. The people realize that in southern California.

Mr. MATTHEW. I think the power demands in the upper basin are going to continue to increase.

Senator WATKINS. Certainly they are, and not only will we use all the hydropower we can get, but we will also be producing power from steam plants, possibly nuclear plants, in the future.

Mr. MATTHEW. That is possible.

Senator WATKINS. You can see now every bit of power that will be produced in these dams, at these sites, are programed in this report of the Bureau and in the bill, will be used.

There will be a demand for every bit of it.

Mr. MATTHEW. That is true.

Senator WATKINS. We have a lot of resources up there to process, chemicals, metals, and phosphates, what not—enough to use all of the power.

In fact, the witnesses indicated a year ago they could take all that power and they would be glad to contract for it.

Mr. MATTHEW. I think that is true.

Senator WATKINS. Then, of course, Colorado and Wyoming and New Mexico could in addition and Arizona will have a portion of this power.

Mr. MATTHEW. I stated in here there will be a market for the power.

Senator WATKINS. And California would like to get some of the power, too; is that true?

Mr. MATTHEW. I don't know that is particular true, certainly not at the 6-mill rate.

Senator WATKINS. Of course, unless it is less than that you might not be interested.

Mr. MATTHEW. It would not be economically feasible to take it at that price.

Senator WATKINS. It would be much better for you to keep that water running down the river and take the secondary power from Hoover rather than pay for power at 6 mills. That is the price they are willing to pay.

Mr. MATTHEW. Instead of that we will build steam plants.

Senator WATKINS. In southern California?

Mr. MATTHEW. Yes.

Senator WATKINS. That might be the solution for you folks to withdraw your opposition to this and go ahead and build the steam plants, because you indicate to us we can build cheaper up there than we can fussing around with the hydroplants. You might be able to do the same thing because you have some natural fuel there available.

Mr. MATTHEW. The power demands have to be taken care of; that is what they are doing now, building steam plants.

Senator WATKINS. But when you built these extra transmission lines you had in mind, of course, that your contract with the United States Government would be tapering off; that you would get less and less power all the time as the upper basin develops.

You built those with the intention of getting some of the power from the upper basin States when you increased the lines you put in. I heard them mentioned the other day, by one of the witnesses.

Mr. MATTHEW. Mr. Tilman's testimony will speak for itself.

As I recall, he testified that the third transmission line was built because of the expectation of getting secondary power at Hoover.

Senator WATKINS. The contract also provides there will be a gradual cessation of that secondary power.

Mr. MATTHEW. That is correct as to firm power.

Senator WATKINS. When that is done you expect to get power from the upper basin development. You have had in mind all the time, have you not, Glen Canyon?

Mr. MATTHEW. Not that I know of, but I can't answer for that.

Senator WATKINS. How long have you been with the southern California group in the development of this?

Mr. MATTHEW. I have been with the Colorado Board for about 10 years.

Of all the proposed units of the storage project, the Bureau's cost estimates indicate that the Glen Canyon Reservoir and power development is the only one that can clearly stand on its own feet as a financially sound project unit.

Analyses indicate that the cost of power from most of the other proposed units of the storage project, considered individually and on the basis of either the total cost or the power allocations alone, would be greater than the proposed selling price, and that, power revenues from the Glen Canyon unit would have to subsidize most, if not all, of the other storage units in addition to subsidizing participating irrigation projects.

It appears questionable, therefore, whether other storage units would be justified or needed, from the standpoint of either the hold-over storage requirements or the value of the power produced, now or for many years in the future.

In view of the large evaporation losses involved which would reduce the available water supply for present economic uses downstream, storage units should not be built in the upper basin in advance of their need in connection with consumptive use projects.

Justification for Federal power projects has usually been made on the ground that they will bring low-cost power to large numbers of people.

But this bill would necessarily involve high-cost power in order to provide the bank account to subsidize infeasible irrigation projects. Power could be developed at Glen Canyon and delivered to load centers for 3.75 mills per kilowatt-hour, and still retire with interest in 50 years all the Government investment in that structure charged to power; for 4 mills per kilowatt-hour, and also repay the irrigation allocation, and for 4.3 mills per kilowatt-hour, and retire the entire cost of the dam and powerplant with interest in 50 years, based on an interest rate of 2½ percent.

Yet that power is proposed to be sold for 6 mills or more in order to subsidize the other proposed power projects and irrigation. Six-mill power from a Federal project can hardly be classed as low-cost power. It is closely equivalent to the cost of steam-electric power.

It is well known that the region in which the power dams would be constructed has a vast mineral potential. Here are located what are believed to be the greatest coal, oil shale, and uranium deposits in the country. This combination, considering the fact that atomic-electric power is already being generated at decreasing costs, raises the question of whether the competitive market value of power would remain as high as 6 mills in that region for even the next several decades, let alone the next 75 years.

Yet what questionable financial prop there is to this project is dependent upon 6-mill power being sold for at least that period—an expectation that is highly speculative, to say the least.

It is evident that the primary purpose of the storage units proposed for initial authorization would be to provide a source of revenue—which, however, would not be available for 45 to 50 years—to finance a major portion of the cost of the participating irrigation reclamation projects.

Senator WATKINS. May I ask you a question at this point?

You are talking about the speculation. We take upstream. As I remember the testimony yesterday, you did some speculating when you had the Hoover Dam built and the speculation turned out that you lost $4 million which you were glad to have absorbed.

You did not run out on the contract simply because it cost you a little money; you could not sell the power.

Mr. MATTHEW. That was a speculation, Senator, as to whether the power could be used in the market.

In this case there is no question but what there is a market for power, but the question is whether you can continue to sell power up there for 6 mills for 75 or 100 years.

Senator WATKINS. You do not mean to say that if you had sold it at a lower price, that California-Edison would not have bought all you could produce over there, and closed down its fuel plants that produced electricity?

Mr. MATTHEW. Over where?

Senator WATKINS. Over in the area where you took this power. California-Edison could have served a lot of the country around Los Angeles.

Mr. MATTHEW. They are taking power from Hoover.

Senator WATKINS. In addition to what you are taking?

Mr. MATTHEW. The Hoover power contracts cover both public and private utilities.

Senator WATKINS. The fact is you speculated, but you do not want us to speculate.

Mr. MATTHEW. They did speculate to some extent.

Senator WATKINS. And lost some money; is that correct?

Mr. MATTHEW. That is correct.

Senator WATKINS. According to the sympathetic story we heard yesterday.

Mr. MATTHEW. That is right; they didn't speculate on price.

Senator WATKINS. We have to dig out some money out of our own pocket. It still would be worth it.

Mr. MATTHEW. I was going to say it would be probably out of the pockets of the taxpayers.

Senator O'MAHONEY. I understood you to give your opinion in response to Senator Watkins. In this case there is a definite market for power?

Mr. MATTHEW. That is correct.

Senator O'MAHONEY. So if any other witness says there is no market, that witness in your judgment is mistaken?

Mr. MATTHEW. I think the evidence is clear that there is a market for power up in the Colorado River Basin that will absorb the amount of energy, but there is the question of where you get that power from. There are alternate sources.

Senator O'MAHONEY. Oh, yes; I understand that, of course.

There are many witnesses who think power can be produced only in the lower basin.

Mr. MATTHEW. I have not heard any.

Senator O'MAHONEY. Or on the western coast of California.

Mr. MATTHEW. No, sir; I have not heard any witnesses testifying to that.

Senator WATKINS. Is it not true that power is produced at different costs in different plants and utility systems, but that a uniform rate is charged for power from the system irrespective of what the various plants produce it for?

Mr. MATTHEW. I don't know as I quite understand the question.

Senator WATKINS. Is it not true that in a utility system, electric power system, that they have some plants that are more efficient than others?

Mr. MATTHEW. That is true.

Senator WATKINS. And it is not based on any one plant's efficiency, but it is based on the overall production cost plus the amount of interest necessary, or profit necessary, for the utility to operate under?

Mr. MATTHEW. Yes. They have to take care of the overall cost.

Senator WATKINS. That is what we have here. That would not be the entire output of power in the upper basin States.

Mr. MATTHEW. None of the participating projects recommended for initial construction would be in themselves financially sound. On the average the water users would be able to pay only about 15 percent of the irrigation investment ranging from $200 to $1,500 an acre on the participating projects proposed in S. 500.

Including the cost allocated to irrigation on the storage units, the water users would be able to pay on the average only 12 percent of the total irrigation investment averaging over $1,000 per acre to irrigate lands having an average value of $150 per acre.

It is proposed by the Secretary and provided in the bill that the portion—about 85 percent—of the irrigation costs of participating reclamation projects beyond the ability of the water users to repay would be repaid from net power revenues of the storage units, after repayment was completed on the power investment of the storage units.

Such financial operation studies as have been furnished by the Bureau of Reclamation indicate that a period of 40 to 50 years or more would be required to repay the power investment with interest at 2½ percent, at the proposed power rate of 6 mills per kilowatt-hour.

Thereafter, under the proposed repayment program, net power revenues would be devoted to repaying, without interest, the costs of the storage projects allocated to irrigation and the major portion of the irrigation investment of participating projects.

However, no financial operation study of the projects proposed in S. 500 have been furnished as yet.

Thus, the proposed repayment program, if adopted, would involve the postponement of starting the repayment of the costs allocated to irrigation on the storage units and on a major portion of the irrigation costs of the participating projects, for a period of about 50 years. These irrigation costs for which repayment would be deferred would comprise, according to Bureau estimates, a minimum of about $286 million for the projects recommended for initial authorization by the Secretary and about $608 million, including all of the projects and units proposed for authorization in S. 500.

The postponement for about 50 years of starting repayment of such a large part of the construction cost of the proposed development would obviously greatly increase the subsidy from the Federal Treasury in interest costs on the funds advanced, that would have to be paid out of Federal taxes. The accumulated interest charges on the funds borrowed by the Federal Government to defray the costs of the project allocated to irrigation could and would never be repaid from project revenues and would have to be paid out of general taxes even though the capital investments were eventually repaid.

The resulting national debt would keep on increasing indefinitely unless or until paid off by general taxes.

The increase in the national debt resulting from the Federal subsidy in accumulated interest charges would be several times the original irrigation investment.

Based upon the projects proposed for initial authorization by the Secretary of the Interior the Federal subsidy in these accumulated interest costs at the end of the overall repayment period set forth by the Bureau of Reclamation, page 192, House Committee hearings, H. R. 4449, would amount to over $2,500 per acre on the area to be irrigated, of 366,000 acres.

With the inclusion of the additional storage and power units and participating irrigation projects proposed in S. 500, the Federal subsidy would be over $5,000 per acre.

The proposed financial plan and repayment program for the Colorado River storage project and participating projects constitutes a material departure from existing reclamation law. It is not in accord with sound standards and policies for reclamation development, and in the light of the greatly increased Federal subsidy involved, is not in the national public interest.

Authorization at this time premature: It is evident from a review of the official reports of the Bureau of Reclamation on the Colorado River storage project and the participating irrigation projects, and the testimony of Bureau witnesses at the hearings on proposed legislation, that the investigations, surveys, and studies with respect to engineering and the economic and financial aspects of the proposed developments are inadequate and far from complete. The Bureau's 1950 project planning report on the storage project and individual reports on the participating irrigation projects, reveal the need for more thorough investigations and surveys.

Even for the Glen Canyon storage unit, which has evidently been investigated and explored most thoroughly of all the proposed storage units, the Secretary of the Interior in a recent communication placed in the record of these hearings, has expressed concern over the adequacy of the foundations and the feasibility of building a dam of the height proposed, and states that decisions as to final plans would not be made until further studies are completed.

Senator WATKINS. You heard the explanation made by Mr. Dexheimer, the Commissioner of Reclamation, and Mr. Larson, the regional director. You do not seem to have any confidence in their statements apparently, by what you say.

Mr. MATTHEW. I heard their statements, Senator, but I did not get the idea that they don't feel there is still a lot of investigation to be made there.

Senator WATKINS. That is true on every project. You do not do all the pinpointing on everything, before you get an authorization, do you, ordinarily?

Mr. MATTHEW. Well, in a project of this magnitude, I think it would be well to have plans well advanced so that the feasibility and the cost estimates and so on would be without question.

Senator WATKINS. As I understand, they give their definite opinion that they would be safe at the height proposed, but it might be if you increase the height of Glen Canyon to one suggested by some other people who suggested it as an alternate, that it would be unsafe, in their judgment.

Mr. MATTHEW. Yes; I heard their testimony.

The United States Geological Survey in its report, House Document 364, raises several important questions that need to be investigated, including the geologic formations in the proposed Echo Park and Glen Canyon Reservoirs that may result in serious leakage from the reservoirs, and the groundwater hydrology of the proposed reservoir basins and adjacent areas.

Senator WATKINS. Is it not true when Hoover Dam was authorized, not only were the plans not complete, but they had not even decided finally on the location of the dam?

Mr. MATTHEW. The plans were very complete by the time the Hoover Dam was authorized. The Weymouth reports were put out about 1924 as I recall, and they were very complete and extensive, and recommended the dam at the site where it was built.

Senator WATKINS. Are you sure about that?

Mr. MATTHEW. Quite sure.

Senator O'MAHONEY. As a matter of fact, Senator Watkins, the history of the Hoover Dam, I think, will show that Commissioner Davis of the Bureau of Reclamation for a long time wondered whether or not Hoover would be feasible, itself.

Of course, it was a tremendous undertaking in what was at that time an unknown field and there were many, many commentators in the old days who thought it was utterly absurd to try to harness the Colorado River. They said it was an area where man would be utterly incompetent and unable to master the floods that poured down that basin.

Fortunately for our friends who have been testifying yesterday and today, Congress was not deterred by those men of little faith who said it could not be done.

I may say, Mr. Matthew, that the arguments you are making today are the arguments that I read many, many years ago before Hoover Dam was built. I do not think they are based upon anything more than fear and lack of faith in the capacity of engineers and individuals who dare to set upon these projects to encompass the harnessing of a vast stream, a source of power and energy and water supply for farms and for homes and for factories which has for thousands of years gone to waste.

We, in the upper basin, propose not to permit that waste to continue. We believe that history of the old West, particularly the history of the development of California, demonstrates that man can conquer these elements of nature.

Mr. MATTHEW. Senator, as an engineer, I have no fear that the engineering problems can be worked out and will be worked out. The only point is that the Secretary himself has expressed concern about this thing and indicated that considerable more investigation needs to be done.

Senator WATKINS. You, of course, know that the Secretary is not an engineer, but you heard from the engineers who were responsible.

Mr. MATTHEW. I have no doubt, Senator, that when he wrote that letter, he must have had the advice of his engineers.

Senator WATKINS. You do not think he has had the advice of Dexheimer who has testified to the contrary.

Mr. MATTHEW. I can't tell you whose advice he had, but I am sure he must have had somebody's advice.

Senator WATKINS. Apparently not the advice of the engineers.

Mr. MATTHEW. The provisions of the bill S. 500 itself, which require further studies and reports by the Secretary of the Interior on economic feasibility and financial reimbursability of the proposed participating irrigation projects previously recommended by the Secretary, and complete project planning and feasibility reports with review by affected States and specific subsequent action by Congress as to authorization for the Navaho and San Juan-Chama projects, point up the fact that reliable information is not now available regarding engineering, economic, and financial aspects of the projects sought to be authorized by the bill.

In addition, proposals have been made for inclusion of projects in the bill on which thus far only the barest reconnaissance surveys have been made by the Bureau.

It would seem that Congress might well await the completion and submission of all of these necessary reports before considering the justification and merit of authorizing the Colorado River storage project and participating projects as proposed in the bill.

Senator WATKINS. May I call attention to page 3 of the bill, line 13:

> That (a) construction of the participating projects set forth in this clause (2) shall not be undertaken until the Secretary has reexamined the economic justification of such project and, accompanied by appropriate documentation in the form of a supplemental report, has certified to the Congress, through the President, that, in his judgment, the benefits of such project will exceed its costs, and that the financial reimbursability requirements set forth in section 4 of this act can be met. The Secretary's supplemental report for each such project shall include, among other things, (i) a reappraisal of the prospective direct agricultural benefits of the project made by the Secretary after consultation with the Secretary of Agriculture; (ii) a reevaluation of the nondirect benefits of the project; and
>
> (iii) allocations of the total cost of construction of each participating project or separable features thereof, excluding any expenditures authorized by section 7 of this act, to power, irrigation, municipal water supply, flood control or navigation, or any other purpose authorized under reclamation law.

I call your attention to the care which has been taken with respect to the participating projects to which you seem to make objection. Of course, those projects have not been all engineered to the final phase because it would be an enormous cost to do that.

Reconnaissance surveys have been made, the estimates have been made, the best they can under those circumstances, and further studies will go on, but this is a comprehensive plan.

It seems to miss the view of most of these witnesses from California who have testified that that is a comprehensive program.

We start off with some sections of that program, some parts of the program which have been developed to the point where they can say "go ahead." Survey has been made enough to know where the water can be used and that they are feasible. You cannot expect on a project of this size to have it down to a fine point as you would have for one dam, such as Hoover, for instance.

Mr. MATTHEW. The point I am making is that the studies and investigations are inadequate to justify authorization at this time.

Senator WATKINS. Shall we wait or come along like you folks did down there, take one at a time and bringing it in without taking in the prospect of the whole river? Each one of these depends to a certain extent on the other. It is a comprehensive program in which all the advantages, all of the facilities and the resources growing out of

the use of this water and the development of this stream have to be put together in order to make the whole thing feasible.

It is all feasible because if we pool our resources in these four States, the water rights we own, and provide a very fine careful development of the upper river, we can fulfill our requirements, our obligations under the compact, permit you people to live and develop and at the same time put to beneficial use the water which has been given us under the compact.

Mr. MATTHEW. I understand that.

Senator WATKINS. I understood in the years that I have been on this committee, now some 8 years, we have had California people in here one time asking for a resolution which would permit them to bring the United States into a case to adjudicate their rights to the lower basin.

We were assured time and time again by the representatives of California, and I think you were present during some of those times, when they assured us there would be no obstacles thrown in the pathway for the development of the upper basin States. That is what surprises me, when we really get around to do it, those people are not here.

Senator Downey is not here. Governor Warren is not here. And other people who assured us from the standpoint of California that they were not going to throw obstacles in the way of the upper basin States to make development.

I think the record could be brought in to show that we had these assurances.

Senator KUCHEL. Are you suggesting any such assurances on behalf of the colleague you are sitting beside?

Senator WATKINS. You were not here then.

Mr. MATTHEW. Previously, I believe it was thought we had a meeting of the minds as to the interpretation of the compact.

Senator WATKINS. The interpretation of the compact seems to vary with the needs of the people in southern California. It keeps expanding all the time.

Mr. MATTHEW. It has been the same as far as I know, Senator, and the legal counsel will speak to that. It has been the same from the inception of the——

Senator WATKINS. I am talking about that which is expressed not that which they had in their own minds.

Mr. MATTHEW. What I am pointing out here is that there is a question of economic justification, or the bill would not provide for reports. I am suggesting here you might well await those reports before Congress passes on the merits.

Senator WATKINS. We have to have every detail, every detail has to be figured out on this comprehensive program before we can start on any of it?

Mr. MATTHEW. Being asked to authorize a project when they don't know whether it is economically feasible or not.

Senator KUCHEL. What you say is that the usual rule is for Congress to accept or reject the recommendations of the Department of the Interior before it legislates and passes an authorization statute. That is the general rule; is that not right?

Mr. MATTHEW. That is correct.

Senator KUCHEL. And that here, whether it may be defended or not, there is a different theory that here this legislation will say to the extent of congressional approval we will approve whatever the Secretary finally decides. This bill provides that Congress will get out of the business of authorizing and direct the Secretary of the Interior by fiat to decide what projects ought to be authorized, or not. Is that not a fact?

Mr. MATTHEW. I think that is about what that means in that section of the bill.

Senator WATKINS. You speak of that being the usual rule. As I remember, we had a bill here a year ago, not quite a year ago, on the Santa Margarita project. As I remember there were a lot of things left to the future to be determined, not by the Congress, but by certain individuals before that could go ahead.

Senator O'MAHONEY. Please do not mention the Santa Margarita project. You may get me started.

Senator KUCHEL. Our good friend considers that a very bad word.

Let me say this: There are two ways to legislate. I do not want to clutter up this record. I think it is true in that instance you were acting upon a report and recommendation of the Department of the Interior. I think that the witness has a perfect right to make the point that this is a different approach to the problem and that here the Congress is asked not to operate upon a report because there is no report; that here the Congress is being asked in advance to approve what hereafter the report of the Secretary may be.

I do not quarrel with the right of any Member of the Senate to advocate that approach, but it is a different approach; it is a different approach, I think, from the usual approach.

Would you not agree?

Mr. MATTHEW. That is correct.

Senator WATKINS. It is the same approach as on the Santa Margarita.

Senator KUCHEL. No.

Mr. MATTHEW. The bill S. 500 seeks to establish feasibility and repayment standards for reclamation projects which materially depart from existing general reclamation law. Involved are fundamental questions of national policy with respect to reclamation development which are presently under study and soon to be reported upon by the Hoover Commission and the President's Cabinet Committee.

It would seem that Congress should await the reports of these agencies and then determine a general policy before acting upon this legislation.

Furthermore, considering the magnitude of this proposed upper basin development, involving an initial cost of $1.5 billion, and the many unresolved questions regarding engineering, economics, and finance, a properly qualified engineering board should be appointed to review the entire proposal as to engineering, economic, and financial feasibility, and make a report to the Congress before action is taken on this proposed legislation by the Congress.

This was done in connection with the Boulder Canyon project when it was under consideration by the Congress in the twenties. An engineering board—the Seibert Board—was appointed to review that project, involving a cost of only about one-tenth of the estimated initial cost of the development proposed by S. 500.

Surely, if it was deemed necessary for the Boulder Canyon project, it is far more essential in this case.

Senator WATKINS. That was a pioneer venture at that time, was it not, as the chairman said a few moments ago.

Mr. MATTHEW. That is correct, but, nevertheless, it was very thoroughly explored by not only the engineers of the Bureau of Reclamation with the famous Weymouth report, but also this Seibert Board went into it thoroughly before Congress would act on it at all.

Senator WATKINS. This is probably not in your department, but it seems appropriate to refer to it here.

California is asking that nothing be done on this until the compact is interpreted and construed by the Supreme Court. That is a fact, is it not?

Mr. MATTHEW. I would rather have Mr. Ely speak to that.

Senator WATKINS. Is it not a fact that your people have taken that position?

Mr. MATTHEW. Mr. Ely will speak as to that.

Senator WATKINS. The question naturally arises why they did not get a construction of the Colorado 1922 compact before they built Hoover Dam and let the Supreme Court construe it to see what was meant at that time.

Mr. MATTHEW. I think the hearings on the Boulder Canyon project will develop the fact that it was very thoroughly discussed.

Senator WATKINS. I think if you will read all the hearings on this bill in the House and here you will find that it has been very thoroughly discussed, every point that could be raised, I imagine, under any circumstances, has been raised by southern California and we have attempted to answer them and I think we have answered them.

Senator KUCHEL. I want to credit, however, my good friends who propose this bill with considerable imagination, too.

Senator WATKINS. I am saying you will never make any progress in this world unless you have some imagination. I think it was Arthur Brisbane who said:

> What man can imagine he can do if he has the chance.

That is not engineering, but that is good logic.

Mr. MATTHEW. Finally, the plans for the construction and operation of the upper basin storage project and participating projects are predicated upon interpretations of the Colorado River compact governing the rights to the use of Colorado River water that are now at issue before the United States Supreme Court in the case of *Arizona* v. *California, et al.* Whether or not the upper basin States become parties to that suit, the decisions made on the issues raised therein will govern and substantially affect the operations of upper basin developments, and the availability of water for use in the upper basin.

In view of the several foregoing considerations, it is submitted that the authorization of the projects as proposed in S. 500 would be premature at this time.

Senator WATKINS. You did get to the legal phase after all.

Mr. MATHEWS. Not exactly in the maner in which you had in mind, sir. However, I will defer to Mr. Ely to answer that question.

Senator WATKINS. I was saying that is the position of southern California. Now, all this has to be done. I admit it is a wonderful delaying movement.

Senator O'MAHONEY. Are there any further questions?

Senator WATKINS. No.

Senator O'MAHONEY. Mr. Matthew, I am sorry I did not have the opportunity of coming in at the beginning of your statement so I cannot question you about what you may have said before I came in. Of course, I do not want to seem to get into an argument with the witness about the matter, but I cannot refrain from saying that as I have listened to that portion of your testimony I have had the privilege to hear, I cannot avoid the conclusion that you are setting a rule of supercaution to prevent development in the upper basin States while in the bill before us there is plain language of the intent of Congress to make as certain as possible the feasibility of projects.

Let me read it because I think it is important not to convince you, sir, but so that those who may read your testimony will also have the opportunity of reading this language from the bill immediately following what you have had to say.

I am reading from the first section of S. 500, beginning on page 2, line 11, just a few words authorizing:

*** * * the Secretary of the Interior (1) to construct, operate, and maintain the following initial units of the Colorado River storage project. * * ***

Now, that is the basic authorization.

Then when that sentence is concluded, following a colon there is this proviso—in this list we have the participating projects concerning which you have been testifying:

Provided, that (a) construction of the participating projects set forth in clause (2) shall not be undertaken until the Secretary has reexamined the economic justification of such project and, accompanied by appropriate documentation in the form of a supplemental report, has certified to the Congress, through the President, that, in his judgment, the benefits of such project will exceed its costs, and that the financial reimbursability requirements set forth in section 4 of this Act can be met.

Now, there is a clear definite injunction which makes it absolutely certain that before any construction shall be undertaken there will be filed with the Congress in appropriate documentary form, as a supplemental report, a certification by the Secretary, through the President. Congress in this bill is undertaking to place the responsibility on the highest officers in the Government.

Your whole testimony is based upon the assumption that the Secretary of the Interior and the President of the United States, whoever they may happen to be when this time comes and it may be long in the future, are unworthy of trust and confidence, and the Congress or the sponsors of this bill have been reckless in exercising this supercaution to prevent the waste of public money.

I cannot, sir, avoid saying that, as I listened to the witnesses from California, I can see in their minds the knowledge that if this upper basin can be delayed and obstructed the water will continue to flow down that stream; it will continue to be of no use whatsoever to the upper-basin States; it will continue to be of great use to the States in the lower basin and to California, which furnishes not a single drop of the whole system, and that as time goes on, with nothing being done, California may find ways and means, through subsidies if you please, as in the case of the Central Valley and other projects that

you have had, through subsidies as you have in the flood control now going on on the Pacific coast, to obtain the utilization of waterpower.

And I speak not of electrical energy when I speak of waterpower. I speak of the great beneficence that comes to mankind when a supply of water is available.

The position of California in this case is that the upper basin shall be condemned to remain in a desert condition while the water flows down beyond.

We feel certainly that we who have contributed so unhesitatingly in the past to the development of California ought to have your cooperation and help now in building in the upper Colorado River Basin.

Mr. MATTHEW. Mr. Chairman, I appreciate your remarks, but I want to say it is unfair as to the attitude of California. All we have been seeking to do here is to protect our rights, what we consider our just rights, and prevent water being taken away from us.

Senator O'MAHONEY. But you will not accept the certification of the President of the United States, and you want us to wait until a report comes in—Lord knows, what that report will be—of the Hoover Commission, knowing well that that report will have no effect or significance or legal power or force until Congress has acted upon it.

It is just another delay.

Mr. MATTHEW. We are pointing out that it would seem that those things ought to have consideration of Congress.

Of course, it is the prerogative of Congress to decide how they shall legislate.

Senator O'MAHONEY. I am glad that is recognized.

Senator WATKINS. The reports of the commissions come and go. I think we had one in the Truman administration. Now we have this one coming along. And how many more we will have before we start on this project—somebody will not like the Hoover Commission report and they will object to it.

And we will have another report. In the meantime, the river will go roaring away to California.

Mr. MATTHEW. That is an unfair statement. I don't think you mean to imply that. We are trying to protect our water rights and we don't want to have those water rights invaded.

Senator WATKINS. I do not want to be unfair to California, and I do not think we have been unfair to California.

Mr. MATTHEW. On the face of your saying that California wants the whole river.

Senator WATKINS. The only thing, the only way we can judge is by the way they act. And what they said in the committee room in early times that they would not put any obstacles in the river. If I do not think what you are doing is intended to assist us, notwithstanding some of your people are feeling sorry for the people in the upper-basin States who are willing to pay 6 mills per kilowatthour. When you put it on the basis of that kind of objection, it looks like purely and simply an obstruction.

After all, whether we pay that much for power ought to be of no concern of yours as long as we are willing to pay for it and will pay for it.

Mr. MATTHEW. What we are concerned with again is the protection of our just rights.

Senator KUCHEL. Mr. Chairman, before Mr. Matthew retires, I would like to make a very brief statement.

Senator O'MAHONEY. Senator Kuchel.

Senator KUCHEL. I want to say that there is no Member of the Senate for whom I have a higher respect than the acting chairman of this subcommittee. He is my friend.

Senator O'MAHONEY. I thank you, sir.

Senator KUCHEL. For which I am proud.

Senator O'MAHONEY. The feeling is reciprocated.

Senator KUCHEL. And I am flattered and honored.

But I do want to say that I regret the remarks of the chairman. The chairman has the honor to look upon his Gaelic background. I do feel he has been a little bit overcome with emotion here, because, Mr. Chairman, it is true that this gentleman and those others who have testified in opposition to S. 500 come from an area of this country which has attracted millions of people and who each year sees hundreds of thousands of citizens of Wyoming and Utah and Alabama and Arkansas come West to live.

Now, here we have a problem where the legal advisers and the engineers who work for public agencies in California are apprehensive that implicit in this bill is damage and injury and breach to a compact. That is their judgment.

It is their considered judgment. They ought to be run out of town if having arrived at that considered judgment, they failed to speak up, as I know you would want them to do in this committee. And they come here, Mr. Chairman, let me say, in complete sincerity. They come here because they believe that in S. 500 is potential damage to the water supply of millions of people in southern California.

I discussed this problem with them last year. I knew very little about this controversy. I do believe that I can say I make up my mind on these questions as I decide them, and I decided, Mr. Chairman, last year, that there were grave dangers to California and her people in S. 1555 then and S. 500 now.

Now, reasonable people may differ, but I do want the chairman to credit those who oppose this bill with sincerity because I am very glad to credit those who sponsor it with the utmost sincerity.

That is all.

Senator MILLIKIN. Mr. Chairman, I do not have the slightest doubt the representatives of California are sincere in their desire to have the whole Colorado River.

Senator KUCHEL. I regret that comment from my good friend from Colorado.

Senator MILLIKIN. I have accepted your theory that you gentlemen are sincere.

Senator O'MAHONEY. I would like to ask the gentleman from Colorado if there is any Gaelic emotion in that remark.

Senator MILLIKIN. No emotion at all. I accept the full sincerity of the gentleman from California. I think we should take it for granted that they are perfectly sincere and that they are sincere in getting all of the Colorado River and they think they have a right to

it. I think you gentlemen should also agree that we are sincere in the belief that you are not entitled to any such thing.

Senator KUCHEL. I reiterate that and I deny that the people of my State who are here proceed on the premise that they should have all the water in the Colorado River.

Senator MILLIKIN. I say the whole course of action of the State representatives from the beginning of time in these matters is to get the whole Colorado River.

Senator KUCHEL. Your able former colleague, now the governor of your magnificent State, himself suggested that the compact that was entered into by your State and mine and five others had to be interpreted differently than what the Department of the Interior interpreted it in administering this project were this bill to become law.

Senator MILLIKIN. I am not speaking of my former associate, the present Governor of Colorado. I am speaking of the attitude of California's representatives being completely sincere from the first time there was ever any controversy over the Colorado River that their attitude should be one which in the end should bring all of the Colorado River down into California.

Senator KUCHEL. And because I know that the Senator will not take the position that I urge here as conclusive, I cite the testimony of his own colleague from Colorado.

Senator MILLIKIN. Well, I have no question but there may be some differences of opinion about the matter, but I am entitled to my own opinion, having watched many of these procedures, having participated in many aspects of this matter, that I think California is thoroughly sincere, that she wants the Colorado River to come down to California, although not contributing a drop of this water.

Senator KUCHEL. The Senator is far wiser than I am, or ever will be, but the Senator is wrong in saying that that is the position of my people.

Senator MILLIKIN. If that is not the position of the people, they are not doing proper justice to their own State. They should be trying to get all of the Colorado River to California and it is the duty of the other States to see that it will not happen, and it will not happen. That is my completely logical position.

Senator O'MAHONEY. There being no questions evidently, Mr. Matthew, addressed to you, we thank you for your presentation, sir.

Senator WATKINS. I think he has made quite a contribution to stirring up some discussion. It has been very interesting.

Mr. MATTHEW. Thank you, Mr. Chairman and members of the committee.

Senator O'MAHONEY. Now we will have a statement from John J. Dempsey, Representative from the State of New Mexico.

STATEMENT OF HON. JOHN J. DEMPSEY, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF NEW MEXICO

Mr. DEMPSEY. Mr. Chairman and members of the committee, I am appreciative of the opportunity to make a brief statement before your committee in support of S. 500, which authorizes the development of projects to put the waters of the Colorado River to beneficial use in the upper basin States and to properly conserve those waters for that use.

Complete extensive hearings have been held on almost identical legislation in previous sessions of the Congress, notably the 83d.

I shall be brief and confine my remarks largely to the specific proposed projects in New Mexico.

This bill would authorize the Navaho Dam as one of the initial units and its participating projects, as well as the Pine River extension in Colorado, which includes a small area in New Mexico. The bill provides provisional authorization for construction of the Navaho project, made up of two irrigation areas at Shiprock and the South San Juan, comprising about 137,000 acres to be irrigated with water from the Navaho Dam and Reservoir.

Provisional authorization also is proposed for the construction of the San Juan transmountain diversion project for making available to the Rio Grande Valley of New Mexico such Colorado River waters from New Mexico's allotment as would be surplus to the needs in the San Juan area.

As is the case in all of the other upper basin States, it is impossible for New Mexico to use beneficially its allotment of water under the Colorado River compact unless and until this comprehensive program is brought into being.

Today the State can utilize barely 100,000 acre-feet per year of the 838,000 acre-feet to which it is entitled under the compact. Yet the entire State has been suffering from a drought condition for the past 6 years—a condition so aggravated that virtually all of New Mexico has been declared a drought distress area by the President and its economy and development are being dangerously retarded.

It should not be difficult to understand why the annual loss of nearly three-fourths of a million acre-feet of water due to lack of facilities to store and conserve it is of such great concern to the State. That amount of water properly utilized in accordance with the careful planning already done by Federal and State agencies means the difference between poverty, want, and destitution for thousands of New Mexico citizens, both Indian and non-Indian on the one hand, or an adequate livelihood on the other.

In view of the extensive hearings that have been held over the period of several years, I do not feel it necessary to spend much time in impressing upon this committee the necessity for the New Mexico projects. It suffices to say that they will be of direct service to a vast segment of the population of our State and of indirect benefit, therefore, to the entire population.

It is manifestly the obligation of the Congress to enact legislation which will help to insure important national-defense installations in New Mexico, such as the atomic-energy plants at Los Alamos and Sandia base, as well as the large Air Force base at Kirtland Field, an adequate water supply. Those installations are dependent on surface and ground waters in the Rio Grande Valley. They can obtain their requirements from no other source, so their continued successful operation is contingent in no small degree upon passage of this legislation.

The added fact that the Federal Government owns about 40 percent of the State of New Mexico is further reason why the Congress should feel obligated to enact legislation that will help to prevent serious deterioration in the millions of acres of national forests, public domain, and other Federal properties. It is a further Federal obligation

to provide equitable distribution of water in order to maintain the integrity of its agreements with the Indian population of the State which has established water rights under the terms of treaties made with the various tribes.

Failure to recognize this obligation, which the Colorado River compact itself acknowledges, will postpone indefinitely the day when this Indian population can become self-sustaining and cease to be a continuing heavy burden upon the Nation's taxpayers.

I believe, however, that you have full understanding of the situation or the Senate would not have passed this legislation in the last session of Congress.

I regret to be forced to admit that this same understanding did not prevail in the House of Representatives and that obstructive tactics were allowed to prevail to such an extent that the House did not have an opportunity to concur in the Senate's action.

However, I am glad to be able to state that due to some modification in the terms of the bill, a considerable segment of that opposition no longer exists.

In order to understand the motivation for a large part of the opposition to this legislation it is necessary only to refer to the records of the Bureau of Reclamation concerning the distribution of the waters of the Colorado River.

Under the Colorado River compact the lower basin States are entitled to an allocation of 75 million acre-feet in 10 years, or 7½ million acre-feet per year on an average.

The same allocation is made to the upper basin States on the basis of presumptive flow.

Because of a lack of facilities for conservation and utilization of their share of the water, the upper basin States have been using approximately 2 million acre-feet a year. The lower basin States, however, have been receiving an average of approximately 12 million acre-feet per year in actual river flow at Lee Ferry, the measuring point for water flowing from the upper basin.

The total amount of water that has passed Lee Ferry in the 15 years from 1940 to 1954, inclusive, is 180.4 million acre-feet. In only 2 of those years, 1940 and 1954, has that flow of water been less than 7.5 million acre-feet.

In 1952 it was 18 million acre-feet. Proper storage capacity in the upper basin States would equalize that year-to-year flow and prevent waste.

Simple arithmetic shows that during the 15 years between 1940 and 1954, the lower basin States had available for their use approximately 150 million acre-feet of water more than were utilized by the upper basin States.

The lower basin States had an excess of 67.5 million acre-feet of water from the Colorado River over their allotment under the compact during these 15 years. The fact that the most of this precious water has flowed into the Pacific Ocean aggravates the loss suffered by the upper basin States.

California is the most favored beneficiary of this surplus, both in water and in the electrical power generated at Boulder Dam. California will continue to be the preponderant beneficiary so long as the upper basin States are unable to utilize their fair share of the waters,

something that they never will be able to do until this legislation is enacted and the development it authorizes becomes an actuality.

It does not require any considerable amount of sagacity on our part to find California's motive for delaying this legislation over the years and seeking now to delay it still further.

The record tells the story. The record, however, does not reveal the hardships that have been endured by the people of New Mexico because of the avarice and unfairness of politically powerful neighbors. The people of the other upper basin States are also victims of this selfishness.

It is inconceivable that the 84th Congress will yield to the same pressures that were able to prevent the passage of this legislation in the House in the 83d Congress. I am confident that its approval again by the Senate will result in its enactment into law.

Senator KUCHEL. Mr. Chairman, Mr. Hewes is from Imperial Valley, presently a member of the Colorado River Board of California, and is president of the board of directors of the Imperial irrigation district in central California.

STATEMENT OF EVAN T. HEWES, REPRESENTING THE COLORADO RIVER BOARD OF CALIFORNIA

Mr. HEWES. Mr. Chairman, my name is Evan T. Hewes. I am a member, and appear here today as a representative of the Colorado River Board of California, which I served as chairman and Colorado River Commissioner from 1938 to 1947.

This board, under the law of our State, has been delegated the duty of and responsibility for protecting the rights and interests of the State of California in the use of the waters of the Colorado River system.

In addition, for the past 43 years, I have farmed in Imperial Valley and have taken an active part and interest in the affairs of the Imperial irrigation district since 1916.

For 22 years I have served as president of the board of directors of the district and am also its executive superintendent.

Both the Colorado River Board of California and the board of directors of Imperial irrigation district are unanimous in opposition to Senate bill 500 as introduced in the United States Senate. Our opposition to S. 500 includes the following points:

1. The principles upon which the bill is based are in conflict with the meaning and intent of the Colorado River compact as it became effective on June 29, 1929.

2. The provisions of the bill, if carried out as planned, would be in violation of the meaning and intent of the Boulder Canyon Project Act of December 1928.

3. This legislation is premature; it may prove detrimental to the general welfare of the area it is supposed to benefit most, and most certainly it is detrimental to the general welfare of the Nation as a whole.

Conflict with compact

That the principles upon which S. 500 is based are in conflict with the meaning and intent of the compact is confirmed by the debates which took place during the negotiations of the compact and in the

answers given in 1923 by the Honorable Herbert Hoover, who served as chairman of the compact commission, to questions asked of him concerning interpretations of the compact.

At the time the compact was negotiated, the total use of water in the upper basin States was only about 2 million acre-feet per year, as compared to perfected rights at that time in the lower basin States to over 7 million acre-feet per year.

In addition, legislation—the Swing-Johnson bill—was before the Congress providing for the use of over 2 million acre-feet of additional water in the lower basin States. The upper basin States demanded the compact as their price for not opposing the Swing-Johnson bill, insisting—for political reasons, so they stated—upon the right to claim as, if, and when, they might be able to use it, the use of a quantity of water equal to that apportioned to the lower basin States under article III–a of the compact; i. e., 7½ million acre-feet per annum.

California was induced to ratify the compact and accept the limitation imposed upon uses of Colorado River water in California by the Boulder Canyon Project Act on the assurance of leaders in the upper basin States that the latter, as a practical matter, would never be able to utilize more than 6 million acre-feet per year, and that included in this amount was an allowance for the ultimate possible transmountain diversion use of not to exceed 500,000 acre-feet per year.

It should be noted that the present transmountain diversion use in the upper basin approximates this 500,000 acre-feet.

Furthermore, California believed then, and still believes, that by the inclusion of article VIII in the compact, all of our perfected rights, both as to quality and quantity, would be protected.

We had suffered severe water shortages because of interference with the flow of the river by junior appropriators in the upper basin.

Therefore, the protection of our perfected rights was of great importance to us—as a matter of fact, article VIII was known as the Imperial Valley section of the compact.

The major participating projects included in S. 500 would be transmountain diversion projects. These would divert water from high elevations out of the Colorado River Basin. This is water of the highest quality, and, therefore, the result would be a serious impairment of the quality of the water coming into the lower basin at Lee Ferry.

At the present time water in the lower basin contains about 1 ton of salts per acre-foot. This means that if we apply, say, 4 acre-feet of water per acre of crop during the year, we put 4 tons of salt on that acre. Whether the salt content of the water may be increased, and if so, how much, without affecting the production of the types of crops we grow, has not been determined.

We say that until this matter of quality has been finally determined in all respects, there should be no additional transmountain diversion projects constructed in the upper basin.

S. 500 would authorize the construction of six large storage reservoirs, from which there would be evaporation of large quantities of water, also increasing the salt content of the lower basin water at Lee Ferry. These reservoirs are not needed to deliver water for domestic and agricultural purposes in the upper basin and, therefore, under article III–e of the compact, this water lost through reservoir evapora-

tion is water to which the lower basin has a right for domestic and agricultural purposes.

S. 500 purports to comply with the compact, but is based upon interpretations of the document which are now at issue before the United States Supreme Court in the case of *Arizona* v. *California* et al. These interpretations, which the upper basin States support for their own benefit, relate to the definition and measurement of beneficial consumptive use and to the obligations of those States to deliver water at Lee Ferry for the lower basin. These interpretations of the compact on which the upper basin States rely are in conflict with the interpretations used in 1923 by the negotiators of the compact and as later restated by the Honorable Herbert Hoover.

The point I am trying to make, gentlemen, is this: The compact was supposed to band together the seven States of the Colorado River Basin, under a contract of mutual interest, for the orderly development of the Colorado River system.

It is a compact of all seven States, and yet the upper basin States are resisting with all their resources their being made parties to the pending Supreme Court case, in which they are involved as much as the lower basin States.

If 2 private citizens enter into a contract, 1 of the parties cannot take action that will destroy the equities of the other party to the contract without his consent, and then escape bearing any share of the loss resulting from his own actions.

The upper basin States apparently want to escape completely, if possible, the great injustice which they did to the lower basin States in their support of the Mexican water treaty.

This is what I charge the upper basin States in trying to do with this legislation. I do not believe there should be less integrity and responsibility in contracts between sovereign States than in contracts between private parties, under our form of government. I will refer to this again at a later point in my statement.

CONFLICT WITH BOULDER CANYON PROJECT ACT

S. 500 purports to comply with the Boulder Canyon Project Act of December 1928, but authorizes projects which can destroy a great part of the value of some of the projects constructed under the authority of that act.

The Boulder Canyon Project Act not only approved the Colorado River compact, but also was intended as a blueprint to be followed in subsequent developments of the Colorado River Basin under the compact. The act was passed after being before the Congress of the United States from 1919 until 1928 and then only after it had been amended in all respects demanded by the upper basin States as being necessary, in their opinion, to the protection of their rights.

Among the outstanding features of the Boulder Canyon Project Act were the provisions included to prevent a raid of the Federal Treasury for the projects authorized by that act.

This was accomplished by the provision that before any works could be constructed, the Secretary of the Interior had to secure firm contracts from reliable contractors for the repayment to the Federal Treasury of the cost of construction of Hoover Dam and the All-

American Canal and appurtenances, with a fixed limitation of the total cost.

Furthermore, the cost of the dam was required to be repaid, with compound interest on any unpaid amount of investment.

Now, take a look at S. 500. Certainly the proposed method of financing is not in the least comparable to the method prescribed by the Boulder Canyon Project Act. This is true even if the guesses of the Bureau of Reclamation as to the cost of the projects under S. 500 were realistic, which I submit should be seriously questioned in view of the Bureau's long and almost consistent record of wrong guesses.

If S. 500 is passed by the Congress, it will, in my opinion, constitute one of the greatest raids on the Federal Treasury that has ever occurred. The upper basin States appear to assume that because the compact made reference to the allocation to them of the use of 7½ million acre-feet of water per annum, such constituted a sight draft on the Treasury of the United States to build projects for them to put the water to use, regardless of the cost to the taxpayers of the Nation.

Senator WATKINS. Now, just a moment, Mr. Hewes. You do not believe that we have a sight draft on the Treasury. If we did, we would not certainly be monkeying around with Congress.

Mr. HEWES. Well, I will say from the information I have and based on the discussions that I have heard, everything seems to point to the belief that simply because the compact mentioned 7½ million acre-feet as apportioned to the upper basin States, those States are thereby entitled to Federal projects to put such water to use, regardless of the justification, or lack of it, for these projects, and in spite of the Boulder Canyon Project Act and the obligations of the States as parties to the law of the river. That is the result of this legislation that we are discussing here at the present time.

Senator WATKINS. You are acquainted with the Central Valley project in California, are you not?

Mr. HEWES. Some parts of it.

Senator WATKINS. You never objected to that, have you?

Mr. HEWES. As far as the Central Valley——

Senator WATKINS. Do you know what the plan of financing of that entire project is at the present time?

Mr. HEWES. No; but I will tell you, if there was anything wrong with it, the United States should jump at the present opportunity to sell it back to California and get their money out of it. If it is not a good, sound investment for the United States, why, the United States then, through the Secretary of the Interior, should welcome the opportunity now to turn that project back to the State of California and let us operate it and pay it out.

Senator WATKINS. Pay out all the costs?

Mr. HEWES. Yes.

Senator WATKINS. Flood control and everything else?

Mr. HEWES. Well, flood control, as far as I know, is part of the project, and nobody is advocating that the individual project pay for it.

Senator WATKINS. I think they should, if they are going to expect us to pay for all the costs of some of these.

I think it has been a good policy in the past about flood control to go scot-free from paying any of it back, but I think we are arriving

at the point where even the flood-control people themselves are now thinking seriously of providing repayment at least of a large part of the costs of those projects.

Senator Douglas, from Illinois, introduced a bill a short time ago, after we twitted him over the money they were getting free for flood control, and he said he will submit this.

I do not understand that you are offering to pay those bills.

Mr. HEWES. I don't know how much of the Central Valley project is charged to flood control, but I will say this: if any part of that project imposes more of a burden on the taxpayers of the Nation than that I believe to be involved in the project before us, then it is too bad the Congress of the United States ever built it.

Senator WATKINS. I have been making a little study of what has happened in southern California, particularly around Los Angeles, and I can take the money and compound the interest on it the same way as you people are doing for this part of it, and it runs into astronomical figures on it as well, the country does not get any of it back, except through taxes, neither the principal or interest.

Mr. HEWES. I would be perfectly willing to see imposed on this project all the limitations on any projects authorized for construction in California.

Senator WATKINS. The fact of the matter is that the reclamation program has been expanded and has been broadened and liberalized over the years, and California has participated in that liberalization without any expense on its part.

In fact, it has been a supplicant to get that type of liberalized program for its State.

Mr. HEWES. It certainly is not true, as far as I am concerned.

Senator WATKINS. It may not be with your project in Imperial Valley. It is a fine project. I have visited it and I have great admiration for the people who built it, and I congratulate them on the fact they were able to get a nice powerplant down there that has not cost them practically anything to take the water out of that river. I think it would have been a waste not to build it.

All we want them to say was that they would not want to come along and claim that by taking some of their water upstream will ruin their power business—take away things they think they own.

As a matter of fact, it was a matter of sufferance at a time to use our water until such time as we are ready. I hope that it does not develop down to Pilot Knob that they insist we will have to let the water run down there because somebody will lose some money if we take the surplus out of the river—that part of the river allotted to us.

Mr. HEWES. I am sure that will not happen, although I must say this: Sometimes we think we have written into the legislative law the protective language that anybody should expect, as in the Boulder Canyon Project Act, under which our district was authorized to build the Pipot Knob powerplant. We advanced money to the United States Bureau of Reclamation to design the plant in the early thirties.

Nevertheless, regardless of the fact that our right was written into the Boulder Canyon Project Act to build that plant, opposition from other States in the Colorado River Basin held us from building that plant right up until the present time. It is just now under construction.

Senator WATKINS. I personally felt that your contract provided for the construction of the project, but I also felt that we had to write into it certain requirements and certain protection for people in the upper basin States so that you would not later on claim that we would be compelled or should turn water on down to you so that you would have the same volume that you have now.

Mr. HEWES. You and I know that all those things were done in 1928 and 1932 under the compact.

In other words, the rights to use water for the Pilot Knob plant certainly are fixed in the 1932 contract with the Secretary of the Interior and the Boulder Canyon Project Act. But still, although they were so written down, with protection against injury caused anybody else, that and all the related law that lawmakers could think of at that time being put in as well, nevertheless we were still held up by opposition from the other States in the basin from building the plant.

Senator WATKINS. When protective language was written in the contract and understanding had, I think all objections were removed. You were permitted to go ahead and start construction. I mention that because we see now what happened when Los Angeles was given a contract for power.

Now they are claiming they are losing a lot of power. We are taking away the water, even the secondary water which they understood would be the water belonging to the upper basin States.

Now we are wondering if on the Pilot Knob plant in the Imperial Valley you folks are going to come along and say, "We have so much water running down there; now we want this to run." You are going to take the power out of it until we do use it upstream, I understand, that is one of the reasons the States were very much concerned upstream.

I think their fears were justified. I think Los Angeles in its position before this committee has given complete proof of that justification.

Mr. HEWES. There was no change made in the compact or in the language of the Boulder Canyon Project Act as concerns our All-American Canal contract in all the time that we were kept from constructing the Pilot Knob plant.

Senator WATKINS. That was about 2 years ago when I think it was finally authorized, finally permitted to go ahead.

Mr. HEWES. The objections were withdrawn, as far as I know, in 1928.

Senator WATKINS. I went over the contract at the time representing my State. Our people did have some objections until we were dead certain there was not going to be a new right created and some claim made we could not use our water by reason of the fact you had now built a plant and were entitled to have it come down there and had made expenditures.

Mr. HEWES. I am quite sure after the very happy experience I had working with you during the Mexican Water Treaty that if you and I were allowed to sit down at the table together and interpret the compact, without any pressure or influence being brought to bear on us, there would not be much difference between us. While you are a lawyer and I am just a farmer, I believe that a reading

of the language in the compact together with the comments that were left to us by the different negotiators of the compact and the Honorable Herbert Hoover, would result in very little difference of opinion between us.

Senator O'MAHONEY. You may proceed, Mr. Hewes.

Mr. HEWES. Furthermore, S. 500 blueprints nothing. It puts no price tag on anything. It protects neither the lower basin projects, which hold contracts for water and power under the terms of the Boulder Canyon Project Act and which have met the feasibility standards required by the act, nor the taxpayers of the Nation.

In short, all I can make out of S. 500 is that is provides for a blank check on the United States Treasury for an unlimited amount of money to be charged to the Nation's taxpayers, with which the Bureau of Reclamation is to construct a vast, but undetermined number of engineering monuments, regardless of their financial soundness.

Coming back to the Mexican Water Treaty, the Congress provided in the Boulder Canyon Project Act that Hoover Dam was to be constructed for the storage of water to be used exclusively in the United States—water which would have to be relied upon by the projects contemplated in the act.

Despite this fact, the upper basin States supported, with all their political might, the Mexican Water Treaty during its negotiation and again when it came before the United States Senate for ratification.

Senator WATKINS. You would like to amend that a little bit, would you not? There was one group in Utah that did not support that treaty.

Mr. HEWES. Senator, there were a number of individuals in various upper basin States——

Senator MILLIKIN. The gentlemen from California made most extensive arguments about Mexican Water Treaty before the Senate for 3 or 4 weeks. They had an agency here publicizing everything, buttonholing everybody.

We fought it out day after day, week after week, and the vote in favor of the ratification of the Mexican Water Treaty was 76 to 10.

I think that the Mexican Water Treaty has been well settled and it was not settled in a secret way or without debate, it was very ably argued by the representatives from California and the opinion of the Senate was rendered by our vote for the Mexican Water Treaty 70 to 11, or something of that kind.

Senator WATKINS. I happened to represent a group from Utah that was not in favor of that treaty.

Senator MILLIKIN. The Senate determined that you were wrong.

Senator WATKINS. That is right, they did.

Mr. HEWES. I will add this comment, which is not in my paper, Mr. Chairman, if I may.

Nobody knows yet just how much water the Senate of the United States, in ratifying that treaty, gave to Mexico. As far as the Colorado River is concerned, as you no doubt recall, the water that is charged to Mexico under the treaty is measurable water, surface flow, at the border boundary sections of the Colorado River.

Now, Mexico knew at that time and many of the rest of us knew that a large quantity of water would reach Mexico by subsurface flow. Nobody knew how much, but they knew it would be a large quantity of water because about 200,000 acre-feet per annum had been developed from underground sources at that time.

The Mexicans are now making provision to put in large pumping stations to pump water out from under the delta.

The only place from which that water can come, Senator Watkins, is from out of the Colorado River system. Mexico will never be charged 1 acre-foot of that water.

Still the Colorado River system is going to have to contribute all of that additional water in addition to that guaranteed to Mexico from surface flow.

So someone is going to lose very much more water in the United States out of the Colorado River system than that which on the face of the treaty will be charged to Mexico.

The treaty shows what will be charged to Mexico. What the treaty does not show is the quantities which nobody can prevent Mexico from getting out of the Colorado River system, quantities which are at the expense of the water users in the United States.

Senator MILLIKIN. Mr. Chairman, the general view on the Mexican Water Treaty was that California did not have God-given exclusive right to the water of the Colorado River and that Mexico was also on that stream and had some rights and it was appropriate for the Senate to determine those rights and it was done.

Senator O'MAHONEY. Proceed, Mr. Hewes.

Mr. HEWES. This treaty guaranteed the delivery to Mexico each year of 1 million acre-feet more water than Mexico had received or could have received from the natural flow of the Colorado River. In other words, this million acre-feet had to come from water stored by Hoover Dam.

Moreover, the upper basin States knew that the longer record of water yield of the Colorado River system then available showed a lesser quantity of water than was assumed to be available in 1922 when the compact was negotiated.

What the upper basin States thought they were doing was giving away to Mexico water which had been committed to projects in the lower basin, but, in my opinion, they were giving away water which otherwise would have been available for their own use, as well as for use in the lower basin.

It is interesting to note that the quantity of water guaranteed by the treaty to Mexico in perpetutity as a first right on the river is at least three times the quantity of water that Senator Key Pitman, of Nevada, stated on the floor of the Senate, during the debates on the Boulder Canyon Project Act, he could ever conceive of the United States giving to Mexico.

S. 500 IS PREMATURE AND DETRIMENTAL

S. 500 would authorize the construction of a large number of so-called participating irrigation projects, not one of which is justified in view of the present economic conditions in our country.

Even if these participating projects were ever able to pay the pitifully small amount toward their construction cost which the

Bureau of Reclamation guesses they can, the small value that will be created, compared to the cost, will result in 1 of 2 things happening. Either whatever equities the present farmers have in these projects will be confiscated by the charge the Government will make against their property, or the taxpayers will have to pay this part of the bill in addition to the tremendous subsidies occasioned by the type of financing proposed. The most realistic result will probably be both.

Moreover, I believe the passage of this legislation would result in destroying far greater values in the lower basin than would be created in the upper basin.

In connection with this unprecedented subsidy which would be required by these participating projects, it is interesting to note that not one of the upper basin States has come forward and offered to share, as a State obligation, $1 of the cost of such subsidies which must be shouldered by the Nation's taxpayers.

Certainly if these upper basin States, which will benefit from the projects far more than the Nation as a whole, are unwilling to share in the cost of the projects, what justification is there for the whole burden to be put on the Nation's taxpayers?

As already pointed out, the large storage reservoirs which would be authorized by the bill are not needed now; some will never be needed and should not be constructed, and a few will be needed perhaps 30 or 40 years from now.

Therefore, as a farmer in the Imperial Valley, I find myself and my State facing a situation where both the quality and quantity of the water we have built our works to use are threatened, and at the same time we are confronted with a large cost in Federal taxes to help pay for the octopus that would damage us.

In conclusion, I respectfully ask this question: In view of the fact that S. 500 involves vital Colorado River compact interpretations which are at issue in the pending case of *Arizona* v. *California*, in the Supreme Court of the United States; in view of the tremendous debt of our Nation and our inability to balance our national budget, despite the fact that about 25 percent of our earnings go for Federal taxes; in view of the fact that the cost of carrying out the provisions of S. 500 will greatly exceed the value created; in view of the possibility that S. 500, if approved, would destroy more value than it would create; and in view of the fact that by reason of the large surpluses of all our major farm crops, even with reduced acreages, all reclamation projects which do not have a very low fixed charge and cost of operation and maintenance are facing a dark picture economically, I ask you: Why pass such legislation as S. 500?

Senator O'MAHONEY. Mr. Hewes, I have just a few questions.

First, does the Imperial Valley obtain water from Hoover Dam?

Mr. HEWES. Yes, sir.

Senator O'MAHONEY. Does the Imperial Valley contribute anything to the cost of Hoover Dam?

Mr. HEWES. Under the compact and the project both, Senator——

Senator O'MAHONEY. You can give your explanation later. The question is: Does the Imperial Valley contribute, pay anything to the cost of the Hoover Dam?

Mr. HEWES. If I answered that question "Yes" or "No," Senator, it would be misleading.

Senator O'MAHONEY. You may straighten it out afterwards. Please answer it "Yes" or "No."

Either you do or you do not. If there is a reason why you do not, then you can explain that.

Mr. HEWES. Imperial does not contribute directly to the cost of Hoover Dam. Neither does Hoover pay for the All-American Canal. The compact and the Project Act both recognized "present perfected rights" in Arizona and California. Now, speaking specifically for Imperial, it was recognized that the valley was entitled to have its existing perfected rights protected.

So, so far as the perfected rights in Arizona and California are concerned, which existed as of the time of the compact no charge is made for the storage of water at Hoover Dam.

Senator O'MAHONEY. Were you getting your water before the dam was built?

Mr. HEWES. We had diverted as much water before the dam was built as we have ever diverted since.

Senator O'MAHONEY. Where are you getting it?

Mr. HEWES. When I say diverted, I mean getting it.

Senator O'MAHONEY. You were actually obtaining as much water before Hoover Dam was built as you are now?

Mr. HEWES. Yes.

Senator O'MAHONEY. You get no water from Hoover Dam?

Mr. HEWES. Yes.

Senator O'MAHONEY. You do?

Mr. HEWES. Yes.

Senator O'MAHONEY. Prior to Hoover Dam, was your flow regular annually?

Mr. HEWES. No, sir.

Senator O'MAHONEY. It was irregular; was it not?

Mr. HEWES. Yes, and it was more irregular because of the junior appropriators in the upper basin States.

Senator O'MAHONEY. I do not know anything about that, but I am talking about Imperial Valley.

You did get a definite benefit from the building of the Hoover Dam, you are getting water from the Hoover Dam, you are paying nothing for the Hoover Dam, and the flow into the Imperial Valley has been stabilized by the Hoover Dam; is that not correct?

Mr. HEWES. Yes. One of two things had to happen, Senator. Either the junior appropriators in the upper basin States had to be prohibited from diverting water from the river or something had to be done to protect our senior rights in the lower basin.

Senator O'MAHONEY. Your senior rights were protected by the Hoover Dam?

Mr. HEWES. That is right.

Senator O'MAHONEY. And you pay nothing for it. It stabilized the flow of the river.

Senator MILLIKIN. May I ask the gentleman whether his Imperial Valley is a part of the Colorado River Basin.

Mr. HEWES. Senator, I am not sure I heard your question.

Senator MILLIKIN. Is the Imperial Valley part of the Colorado River Basin?

Mr. HEWES. The Bureau of Reclamation in map 2300 shows it; yes, sir.

Senator MILLIKIN. Are you taking any water out of the Colorado River drainage basin for the benefit of lands other than those in the Colorado River Basin area?

Mr. HEWES. The Imperial Valley is not taking any water.

Senator MILLIKIN. Passing Imperial Valley, what about the rest of the water you are taking out?

Mr. HEWES. There is other water being diverted from the river in the State of California for use outside of the Colorado River Basin.

Senator MILLIKIN. So that the transsmountain diversion is nothing new so far as Colorado is concerned?

Mr. HEWES. You mean as far as California?

Senator MILLIKIN. I mean California.

Mr. HEWES. No, sir; there are transmountain diversions in California just the same as there are in any other basin.

Senator MILLIKIN. You are transporting waters out of the Colorado River Basin for the benefit of California?

Mr. HEWES. Yes.

Senator WATKINS. Mr. Hewes, there are other benefits you get out of the Boulder Dam other than just water, the regulation of the water making it more stable, are there not?

Mr. HEWES. Yes, sir; there is more dependable flow.

Senator WATKINS. To be specific about it, the silt control alone is worth millions, is it not? To you people?

Mr. HEWES. Well, I wonder if it is worth any more to us or as much to us as it is to the United States as a whole. You know, Senator Watkins——

Senator WATKINS. First, I want to know what it is worth to you and then we can talk about what it is worth to the United States as a whole.

Mr. HEWES. Yes, it is worth something to us; it also is a liability to us because we are confronted with the tremendous expenditures of tightening our canals because of the increased seepage from the desilted water.

Senator WATKINS. When I was down there it seemed to me the canals had been built, instead of down into the ground, on top of the ground. They were higher than even the roads that ran along aside of them, because of the silt you piled out of them year after year.

Mr. HEWES. They had that appearance and in many cases they were, too, Senator.

Senator WATKINS. I saw the desilting works. I have seen the amount of muddy water that goes into Lake Mead and I have seen the clear water coming out.

So it seems to me a tremendous load of silt has been removed from the river.

As I recall also in the digging into the history of the area down there, silt is one of the worse things they had to fight. It is contigual silt building up the river and cutting the river back, turning the river in other directions, the historic case, of course, is the building of the Salton Sea. All of that has now been stopped by reason of the building of the Hoover Dam and other Federal dams down the stream.

Mr. HEWES. No, sir; it has not all been stopped, Senator. But a large portion of silt has been caught by Hoover and Lake Mead.

Senator O'MAHONEY. In any event, I am sure, Mr. Hewes, you understand that the equalization of the flow of the water to the Im-

perial Valley which you acknowledge was brought about by the construction of the Hoover Dam is no different from the equalization of the flow of the water which will be brought about by the construction of Glen Canyon and Echo Park. The principle is the same in all instances. I am sure you acknowledge that.

Mr. HEWES. No, sir.

Senator O'MAHONEY. Equalization is good for California, but it is bad when it takes place in the upper basin.

Mr. HEWES. I have been told by our engineers, Senator O'Mahoney, that storage in the upper basin is not necessary to equate the flow of the river.

Now, if that is wrong, I have been misinformed. While as much as I would like to agree with the Senator——

Senator O'MAHONEY. I am not going to cross-examine you on engineering nor on law. I just wanted to get that fact in about what you know. And you know that the Hoover Dam has stabilized your flow. You take the water and you paid nothing for the dam.

Are there any other questions?

If not, when the hearing adjourns it will adjourn until 2:30 at the request of the chairman.

Mr. HEWES. Mr. Chairman, I appreciate this opportunity to be heard and thank you.

Senator WATKINS. Before we recess, may I ask permission to have inserted in the record a tabulation giving the details of the principal physical facts for the five powerplant dams and reservoirs to be authorized under S. 500? That is to be the first one.

The second tabulation would compare the proposed initial plans of the Colorado River storage project with other Federal developments in the same category, some constructed and others only authorized for construction.

This was requested by our staff member, Mr. Nelson.

Senator O'MAHONEY. Without objection, it is so ordered.

(The tables referred to are as follows:)

Reservoir data (S. 500, 84th Cong.), Colorado River storage project—Initial conditions

Item	Cross Mountain	Small-Curecanti	Echo Park	Flaming Gorge	Glen Canyon	Navaho	Totals (rounded)
Height of dam-stream bed	295	360	525	440	580	370	
Total capacity, acre-feet	5,200,000	940,000	6,460,000	3,940,000	26,000,000	1,450,000	44,000,000
Active capacity, acre-feet	4,200,000	500,000	5,460,000	2,950,000	20,000,000	780,000	34,000,000
Elevation high water level, feet	6,090	7,520	5,570	6,040	3,700	6,084	
Area, high water level, acres	52,200	9,400	42,400	40,800	153,000	15,000	313,000
Estimated evaporation annually, acre-feet	70,000	18,000	87,000	56,000	526,000	29,000	786,000
Power installation, kilowatts	60,000	40,000	200,000	72,000	800,000		1,172,000
Net annual power, millions of kilowatt-hours	376	195	1,017	388	3,813		5,800
Total estimated cost, (dollars)	50,230,000	49,300,000	176,430,000	82,940,000	421,270,000	36,600,000	816,800,000
Allocated to: Power (dollars)	36,200,000	41,200,000	132,700,000	52,100,000	365,600,000	(F. C. 1,300,000)	630,900,000
Allocated to: Irrigation (dollars)	14,000,000	8,100,000	43,700,000	30,900,000	55,700,000	35,300,000	184,600,000
Active capacity in 200 years, acre-feet	4,000,000	500,000	5,200,000	2,600,000	10,500,000	700,000	24,000,000

NOTES.—Figures in the "Totals" column are purposely rounded to make comparison more readily.
The totals for power installation and production do not include 61,000 kilowatts and 373 million kilowatt-hours of the central Utah project, initial phase.
The total active capacity in 200 years is adjusted somewhat to recognize that some abatement of sedimentation will be accomplished by soil-conservation practices.

Source: From hearings on S. 1555, 83d Cong.

59762—55—36

Comparative hydropower data—Principal Federal plants in the West completed or being constructed

Powerplant	Kilowatts	Million kilowatt-hours	Potential kilowatts installation	Annual output, million kilowatt-hours [1]
5 proposed plants named in S. 500, upper Colorado Basin			1,230,000	6,170
Lower Colorado Basin (Hoover, Parker, Davis)			1,700,000	6,000
Columbia Basin:				
Grand Coulee	1,975,000	15,000		
Bonneville	520,000	4,400		
Hungry Horse	285,000	890		
Chief Joseph	1,730,000	8,680		
McNary	980,000	7,810		
Subtotal	5,490,000	[2] 36,780	5,490,000	36,780
Shasta-Keswick and Folsom-Nimbus			630,000	2,900
Colorado-Big Thompson			180,000	730
Missouri River, 6 main river plants			1,530,000	9,880
Authorized in Columbia Basin but not under construction:				
Dalles	1,092,000	5,080		
Priest Rapids	1,219,000	8,122		
John Day	1,105,000	5,222		
Libby	600,000	2,172		
Ice Harbor	195,000	1,430		
Little Goose	195,000	1,430		
Lower Monumental	180,000	1,330		
Lower Granite	165,000	1,180		
Total	4,751,000	[1] [2] [3] 25,970		

[1] Values include primary and secondary power.
[2] Both figures are exclusive of a number of small installations on tributaries of the Columbia River.
[3] The power production when all plants are in operation will exceed the value given; the separate values being computed without the benefit of upstream storage regulation.

Senator KUCHEL. At last year's hearings before this committee on the Colorado River storage project, I submitted a question intended to bring out the facts regarding the costs for irrigation of new land and for supplemental irrigation, project by project.

However, the figures as furnished by the bureau—Senate hearing, 1954, page 604—failed to include the reimbursable costs allocated to irrigation out of the costs of the storage reservoir units of the Colorado River storage project.

I therefore propose that, for the record of this hearing, the bureau be requested to file a tabulation superseding that appearing at page 604 of last year's hearings, this time including, separately for the new land and the supplemental portions of each project, the allocation to irrigation out of the costs of the storage units.

This new tabulation should include the 14 participating projects and the 6 initial storage reservoir units proposed to be authorized under S. 500, 84th Congress.

Senator O'MAHONEY. What did you mean by the use of the word "superseded"?

Senator KUCHEL. The tabulations furnished last year, in the opinion of the engineers of the several agencies in California, did not include all the information, the breakdown that they wanted.

Senator O'MAHONEY. It is not challenged, the accuracy of the information?

Senator KUCHEL. No.

Senator O'MAHONEY. All right, the request will be granted.

(The material requested follows:)

DEPARTMENT OF THE INTERIOR,
BUREAU OF RECLAMATION,
Washington 25, D. C., March 17, 1955.

Hon. CLINTON P. ANDERSON,
Chairman, Subcommittee on Irrigation and Reclamation, Senate Interior and Insular Affairs Committee, United States Senate,
Washington 25, D. C.

MY DEAR SENATOR ANDERSON: We have the letter of March 11, 1955, from Mr. Lineweaver, transmitting to us a copy of Mr. Ely's letter of March 11. Mr. Lineweaver has asked that the information requested by Mr. Ely be furnished by March 14. It is our desire to be as responsive and helpful as we can, and therefore we are attaching such information as is now available in partial reply to the questions attached to Mr. Ely's letter. As indicated hereinafter, it will require about 60 days to make specific answers to the specific questions. It is our intention, however, to start those studies immediately.

In partial response to question 1 (A), there are attached two tables based upon the projects recommended by the Secretary. These tables present substantially all of the information which has been requested. These are tables 1A and 1B. Table 1A is based upon a 6-mill per kilowatt-hour average power rate and the return of the power investment in the shortest possible time and thereafter utilizing net power revenues to return the irrigation assistance. Table 1B is based on a 6-mill per kilowatt-hour average power rate and upon returning the power investment in 50 years and making concurrent repayment of the irrigation assistance as nearly as that can be done. It should be noted from table 1B that over 70 percent of the total irrigation investment would be repaid concurrently with power repayment under that type of analysis.

We believe these two tables, together with the attached table 1, provide adequate assurance of the repayment of the projects recommended by the Secretary, even though they do not contain all of the refinements asked for in the question. Also attached is table 2 which shows the irrigation assistance required for the other storage units and participating projects in S. 500. Should these projects be authorized and constructed under a requirement for the return of the irrigation costs within 50 years, it would have to be by proper and appropriate timing of the start and the completion of construction. We do not have payout analyses for the projects proposed in S. 500 plus the additional participating projects proposed by Governor Johnson of Colorado. The status of the reconnaissance information on these additional projects is such as to make it very difficult to make any reasonable assumption of a construction period. In addition, except for the Savery-Pot Hook and Fruitgrowers Dam extension projects, the cost estimates and repayment ability studies are not yet reliable and detailed repayment studies would therefore be somewhat meaningless. To work out the information desired on these projects, even if we were to make such assumptions, would require dedetailed payout studies which we estimate will take several weeks.

Question 1 (B). The project recommended by the Secretary would involve an interest cost to the Federal Government discounted to year 1957 of about $175 million based on the allocation to power being repaid in year 2002 and $190 million based on the final payment from the irrigation water users in year 2032. Studies show (1) that compound interest at 2.5 percent on the construction costs would be in the magnitude of $550 million which amount less credits of $15 million for interest on payments by the irrigation users would result in an interest cost in the order of $535 million and (2) that the interest cost incurred through year 2032 and interest from year 2003 to year 2032 on the remaining balance would amount to about $1,200 million which less credits of $47 million for interest on payments of the water users would result in a total interest cost of $1,153 million in year 2032.

To work out the interest cost to the Federal Government for the projects proposed in S. 500 and the S. 500 projects plus Governor Johnson's additions would require first the completion of the detailed payout studies previously indicated. Additional time beyond the completion of those studies will be required to assemble the detailed information requested by Mr. Ely.

Question 2. House Document 364, 83d Congress, 2d session, page 165, gives substantially the information requested in this question. Although this is not upon the exact period requested and it is based upon operation of the originally planned 10-reservoir system, we believe that it shows a reasonable situation.

That table shows that with the 10-reservoir system there is released to Lee Ferry in excess of 10 million acre-feet in most years. With the proposed two-reservoir system these releases would be even greater. To answer the questions specifically would require completely new operating studies, also requiring several weeks' time to complete.

Question 3. In answer to this question, it must be recognized that Mr. Larson stated that one method whereby deficiencies, if any, in the firm power generation in the lower basin, caused by construction of the recommended storage units, could be satisfied would be by substituting Glen Canyon power for such deficiencies. No details have yet been worked out because it appears that such a substitution would be necessary only if we tried to fill the upper basin reservoirs during a critical dry period. Our operation studies show beyond any reasonable doubt that water can be stored in the recommended upper basin reservoirs and still meet required water deliveries and firm power generation in the lower basin. To answer the questions specifically would require operation studies of the entire river system, which we estimate would take about two months. Also, see our reply to question 2.

Question 4. As testified by both Mr. Dexheimer and Mr. Larson, the foundation studies for Glen Canyon Dam have gone way beyond those usually carried out for feasibility studies and authorization. For this reason, we believe there is sufficient assurance that the estimates of costs will prove adequate. The Glen Canyon estimates contain contingency items for each major element of the work. A weighted average of the various contingencies applicable to the total would probably be in excess of 15 percent.

Question 5. Table 2 of Mr. Larson's statement does not include cost estimates for the probable new plan indicated by Mr. Larson for the Curecanti storage unit. Reconnaissance data indicate that such a plan would cost about $88 million.

Question 6. We assume that Mr. Ely is referring to the letter appearing on page 655 of the hearings on S. 1555. That letter dated March 2, 1954, from Assistant Secretary Aandahl, was in reply to a hypothetical question asked by the Bureau of the Budget. It dealt with the technicality of the discount of irrigation benefits. The cost allocations on Echo Park have not been so revised, nor do we believe they should be at this time. Until such time as a realistic estimate is available as to exactly when irrigation development would come into being, such a refinement is, in our judgment, unnecessary.

We are fully aware of the status of the hearings on S. 500 and your desire to have the hearings printed at a very early date. We desire to do everything we can to aid you in that effort. As indicated above, however, our best estimate is that it will take about 60 days to answer the questions in detail and in the specific manner in which they are asked.

We understand from Mr. Lineweaver that Senator Kuchel desires a copy of this letter, so we are attaching an extra copy should you desire to give it to him.

Sincerely yours,

S. W. CROSTHWAIT,
Acting Commissioner.

TABLE 1A.—*Colorado River storage project and participating projects—Financial repayment schedule*

[Units, $1,000]

[Irrigation costs repaid from power revenues following repayment of power costs]

Year of study	Year of power operation	Fiscal year	Net revenues from sale of power at Glen Canyon, Echo Park, and initial phase of the central Utah project at 6.0 mills per kilowatt-hour [1]					Repayment of irrigation costs			Project investment			
											Power		Irrigation	
			Total	Application of net revenues				By power users	By water users [2]	Total	Power investment including interest during construction	Unpaid balance	Irrigation investment	Unpaid balance
				Excess	Power investment	Interest	Irrigation investment							
0													1,900	1,900
1														1,900
2													5,600	7,500
3													10,600	18,100
4													11,395	29,478
5									17	17			25,228	54,689
6									17	17			14,687	69,359
7	0	1961	0	0	0	0			17	17				
8	1	1962	8,361		−763	9,124			50	50	364,970	364,970	103,339	172,648
9	2	1963	13,928		3,439	10,489			50	50	53,830	419,563	31,272	203,870
10	3	1964	16,690		5,528	11,162			91	91	30,366	446,490	9,000	212,779
11	4	1965	19,386		7,603	11,783			135	135	30,366	471,328	21,000	233,644
12	5	1960	22,058		9,706	12,352			209	209	30,366	494,091	22,000	255,435
13	6	1967	24,691		11,797	12,894			216	216	31,373	515,758	22,000	277,219
14	7	1968	24,945		11,715	13,230			216	216	25,235	529,196	5,000	282,003
15	8	1969	26,081		12,651	13,430			302	302	19,700	537,181		281,701
16	9	1970	25,961		12,848	13,113			429	429		524,530	5,000	286,272
17	10	1971	25,835		13,043	12,792			515	515		511,682	4,000	289,757
18	11	1972	25,709		13,243	12,466			515	515		498,639	9,000	298,242
19	12	1973	25,587		13,452	12,135			548	548		485,396	4,354	302,048
20	13	1974	25,452		13,653	11,799			668	668		471,944		301,380
21	14	1975	25,326		13,869	11,457			667	667		458,291		300,713
22	15	1976	25,206		14,095	11,111			668	668		444,422		300,045
23	16	1977	25,080		14,322	10,758			682	682		430,327		299,363
24	17	1978	24,954		14,554	10,400			681	681		416,005		298,682
25	18	1979	24,834		14,798	10,036			682	682		401,451		298,000
									682	682		386,653		297,318

Footnotes at end of table.

TABLE 1A.—*Colorado River storage project and participating projects—Financial repayment schedule*—Continued

Year of study	Year of power operation	Fiscal year	Net revenues from sale of power at Glen Canyon, Echo Park, and initial phase of the central Utah project at 6.0 mills per kilowatt-hour [1]					Repayment of irrigation costs			Project investment			
				Application of net revenues							Power		Irrigation	
			Total	Excess	Power investment	Interest	Irrigation investment	By power users	By water users [2]	Total	Power investment including interest during construction	Unpaid balance	Irrigation investment	Unpaid balance
26	19	1980	24,708		15,042	9,666			681	681		371,611		296,637
27	20	1981	24,576		15,286	9,290			691	691		356,325		295,946
28	21	1982	24,378		15,470	8,908			691	691		340,855		295,255
29	22	1983	24,186		15,665	8,521			713	713		325,190		294,542
30	23	1984	23,988		15,858	8,130			713	713		309,332		293,829
31	24	1985	23,790		16,057	7,733			713	713		293,275		293,116
32	25	1986	23,598		16,266	7,332			713	713		277,009		292,403
33	26	1987	23,400		16,475	6,925			713	713		260,534		291,690
34	27	1988	23,202		16,689	6,513			713	713		243,845		290,977
35	28	1989	23,010		16,914	6,096			713	713		226,931		290,264
36	29	1990	22,812		17,139	5,673			713	713		209,792		289,551
37	30	1991	22,608		17,363	5,245			713	713		192,429		288,838
38	31	1992	22,416		17,605	4,811			713	713		174,824		288,125
39	32	1993	22,218		17,847	4,371			713	713		156,977		287,412
40	33	1994	22,020		18,096	3,924			713	713		138,881		286,699
41	34	1995	21,828		18,356	3,472			713	713		120,525		285,986
42	35	1996	21,630		18,617	3,013			713	713		101,908		285,273
43	36	1997	21,432		18,884	2,548			713	713		83,024		284,560
44	37	1998	21,240		19,164	2,076			713	713		63,860		283,847
45	38	1999	21,042		19,445	1,597			713	713		44,415		283,134
46	39	2000	20,844		19,734	1,110			713	713		24,681		282,421
47	40	2001	20,646		20,029	617	0	0	713	713		4,652		281,708
48	41	2002	20,448		4,652	116	15,680	15,680	713	16,393		0		265,315
49	42	2003	20,250		0	0	20,250	20,250	713	20,963				244,352
50	43	2004	20,058				20,058	20,058	713	20,771				223,581
51	44	2005	19,860				19,860	19,860	713	20,573				203,008
52	45	2006	19,662				19,662	19,662	713	20,375				182,633
53	46	2007	19,470				19,470	19,470	713	20,183				162,450
54	47	2008	19,272				19,272	19,272	713	19,985				142,465
55	48	2009	19,074				19,074	19,074	713	19,787				122,678
56	49	2010	18,882				18,882	18,882	713	19,595				103,083
57	50	2011	18,684				18,684	18,684	692	19,376				83,707

58	51	2012	18,588				18,588	18,588	693	19,281				64,426
59	52	2013	18,486				18,486	18,486	672	19,158				45,268
60	53	2014	18,390				18,390	18,390	627	19,017				26,251
61	54	2015	18,294	0			18,294	18,294	553	18,847				7,404
62	55	2016	18,192	14,013			4,179	4,179	545	4,724				2,680
63	56	2017	18,096	18,096			0	0	544	544				2,136
64	57	2018	18,000	18,000					472	472				1,664
65	58	2019	17,898	17,898					345	345				1,319
66	59	2020	17,802	17,802					259	259				1,060
67	60	2021	17,706	17,706					246	246				814
68	61	2022	17,604	17,604					215	215				599
69	62	2023	17,508	17,508					93	93				506
70	63	2024	17,412	17,412					93	93				413
71	64	2025	17,310	17,310					93	93				320
72	65	2026	17,214	17,214					63	63				257
73	66	2027	17,118	17,118					63	63				194
74	67	2028	17,016	17,016					50	50				144
75	68	2029	16,920	16,920					50	50				94
76	69	2030	16,824	16,824					50	50				44
77	70	2031	16,722	16,722					22	22				22
78	71	2032	16,626	16,626					22	22				0
Total			1,475,042	291,789	586,206	328,218	268,829	268,829	36,546	305,375	586,206		805,375	

[1] Includes revenues from the sale of a small amount of pumping energy at 3.0 mills per kilowatt-hour.

[2] Following a development period for each block of irrigation, the repayment ability of the irrigators has been based on 50 equal annual payments excepting the authorized Eden and Paonia projects which require 60 and 68 annual payments, respectively.

TABLE 1B.—*Colorado River storage project and participating projects—Financial repayment schedule*

[Units, $1,000]

[Power costs repaid in 50 years. Residual revenues from sale of power applied to repayment of irrigation costs]

Year of study	Year of power operation	Fiscal year	Net revenues from sale of power at Glen Canyon, Echo Park, and initial phase of the central Utah project at 6.0 mills per kilowatt-hour [1]					Repayment of irrigation costs			Project investment			
				Application of net revenues							Power		Irrigation	
			Total	Excess revenues	Power investment	Interest	Irrigation investment	By power users	By water users [2]	Total	Power investment including interest during construction	Unpaid balance	Irrigation investment	Unpaid balance
0		1954											1,900	1,900
1		1955												1,900
2		1956											5,600	7,500
3		1957							0	0			10,600	18,100
4		1958							17	17			11,395	29,478
5		1959							17	17			25,228	54,689
6		1960							17	17	0	0	14,687	69,359
7	0	1961	0		0	0	0	0	50	50	364,970	364,970	103,339	172,648
8	1	1962	8,361		−1,948	9,124	1,185	1,185	50	1,235	53,830	420,748	31,272	202,685
9	2	1963	13,928		1,455	10,519	1,954	1,954	91	2,045	30,366	449,659	9,000	209,640
10	3	1964	16,690		3,106	11,241	2,343	2,343	135	2,478	30,366	476,919	21,000	228,162
11	4	1965	19,386		4,738	11,923	2,725	2,725	209	2,934	30,366	502,547	22,000	247,228
12	5	1966	22,058		6,390	12,564	3,104	3,104	216	3,320	31,373	527,530	22,000	265,908
13	6	1967	24,691		8,022	13,188	3,481	3,481	216	3,697	25,235	544,743	5,000	267,211
14	7	1968	24,945		7,791	13,619	3,535	3,535	302	3,837	19,700	556,652		263,374
15	8	1969	26,081		8,483	13,916	3,682	3,682	429	4,111	0	548,169	5,000	264,263
16	9	1970	25,961		8,589	13,704	3,668	3,668	515	4,183		539,580	4,000	264,080
17	10	1971	25,835		8,691	13,490	3,654	3,654	515	4,159		530,889	9,000	268,911
18	11	1972	25,709		8,798	13,272	3,639	3,639	548	4,187		522,091	4,354	269,078
19	12	1973	25,587		8,910	13,052	3,625	3,625	668	4,293		513,181	0	264,785
20	13	1974	25,452		9,013	12,830	3,609	3,609	667	4,276		504,168		260,509
21	14	1975	25,326		9,127	12,604	3,595	3,595	668	4,263		495,041		256,246
22	15	1976	25,206		9,248	12,376	3,582	3,582	682	4,264		485,793		251,982
23	16	1977	25,080		9,368	12,145	3,567	3,567	681	4,248		476,425		247,734
24	17	1978	24,954		9,490	11,911	3,553	3,553	682	4,235		466,935		243,499
25	18	1979	24,834		9,622	11,673	3,539	3,539	682	4,221		451,313		239,278
26	19	1980	24,708		9,750	11,433	3,525	3,525	681	4,206		447,563		235,072
27	20	1981	24,576		9,877	11,189	3,510	3,510	691	4,201		437,686		230,871
28	21	1982	24,378		9,948	10,942	3,488	3,488	691	4,179		427,738		226,692
29	22	1983	24,186		10,027	10,693	3,466	3,466	713	4,179		417,711		222,513

30	23	1984	23,988	----------	10,101	10,443	3,444	3,444	713	4,157	----------	407,610	----------	218,356
31	24	1985	23,790	----------	10,179	10,190	3,421	3,421	713	4,134	----------	397,431	----------	214,222
32	25	1986	23,598	----------	10,263	9,936	3,399	3,399	713	4,112	----------	387,168	----------	210,110
33	26	1987	23,400	----------	10,344	9,679	3,377	3,377	713	4,090	----------	376,824	----------	206,020
34	27	1988	23,202	----------	10,427	9,421	3,354	3,354	713	4,067	----------	366,397	----------	201,953
35	28	1989	23,010	----------	10,517	9,160	3,333	3,333	713	4,046	----------	355,880	----------	197,907
36	29	1990	22,812	----------	10,605	8,897	3,310	3,310	713	4,023	----------	345,275	----------	193,884
37	30	1991	22,608	----------	10,689	8,632	3,287	3,287	713	4,000	----------	334,586	----------	189,884
38	31	1992	22,416	----------	10,786	8,365	3,265	3,265	713	3,978	----------	323,800	----------	185,906
39	32	1993	22,218	----------	10,880	8,095	3,243	3,243	713	3,956	----------	312,920	----------	181,950
40	33	1994	22,020	----------	10,977	7,823	3,220	3,220	713	3,933	----------	301,943	----------	178,017
41	34	1995	21,828	----------	11,080	7,549	3,199	3,199	713	3,912	----------	290,863	----------	174,105
42	35	1996	21,630	----------	11,182	7,272	3,176	3,176	713	3,889	----------	279,68[F]	----------	170,216
43	36	1997	21,432	----------	11,286	6,992	3,154	3,154	713	3,867	----------	268,395	----------	166,349
44	37	1998	21,240	----------	11,398	6,710	3,132	3,132	713	3,845	----------	256,997	----------	162,504
45	38	1999	21,042	----------	11,507	6,425	3,110	3,110	713	3,823	----------	245,490	----------	158,681
46	39	2000	20,844	----------	11,620	6,137	3,087	3,087	713	3,800	----------	233,870	----------	154,881
47	40	2001	20,646	----------	11,734	5,847	3,065	3,065	713	3,778	----------	222,136	----------	151,103
48	41	2002	20,448	----------	11,853	5,553	3,042	3,042	713	3,755	----------	210,283	----------	147,348
49	42	2003	20,250	----------	11,973	5,257	3,020	3,020	713	3,733	----------	198,310	----------	143,615
50 *	43	2004	20,058	----------	12,102	4,958	2,998	2,998	713	3,711	----------	186,208	----------	139,904
51	44	2005	19,860	----------	12,229	4,655	2,976	2,976	713	3,689	----------	173,979	----------	136,215
52	45	2006	19,662	----------	12,360	4,349	2,953	2,953	713	3,666	----------	161,619	----------	132,549
53	46	2007	19,470	----------	12,499	4,040	2,931	2,931	713	3,644	----------	149,120	----------	128,905
54	47	2008	19,272	----------	12,635	3,728	2,909	2,909	713	3,622	----------	136,485	----------	125,283
55	48	2009	19,074	----------	12,775	3,412	2,887	2,887	713	3,600	----------	123,710	----------	121,683
56	49	2010	18,882	----------	12,924	3,093	2,865	2,865	713	3,578	----------	110,786	----------	118,105
57	50	2011	18,684	----------	13,072	2,770	2,842	2,842	692	3,534	----------	97,714	----------	114,571
58	51	2012	18,588	----------	13,313	2,443	2,832	2,832	693	3,525	----------	84,401	----------	111,046
59	52	2013	18,486	----------	13,556	2,110	2,820	2,820	672	3,492	----------	70,845	----------	107,554
60	53	2014	18,390	----------	13,810	1,771	2,809	2,809	627	3,436	----------	57,035	----------	104,118
61	54	2015	18,294	----------	14,070	1,426	2,798	2,798	553	3,351	----------	42,965	----------	100,767
62	55	2016	18,192	----------	14,331	1,074	2,787	2,787	545	3,332	----------	28,634	----------	97,435
63	56	2017	18,096	----------	14,604	716	2,776	2,776	544	3,320	----------	14,030	----------	94,115
64	57	2018	18,000	----------	14,030	351	3,619	3,619	472	4,091	----------	0	----------	90,024
65	58	2019	17,898	----------	0	0	17,898	17,898	345	18,243	----------	----------	----------	71,781
66	59	2020	17,802	----------	----------	----------	17,802	17,802	259	18,061	----------	----------	----------	53,720
67	60	2021	17,706	----------	----------	----------	17,706	17,706	246	17,952	----------	----------	----------	35,768
68	61	2022	17,604	----------	----------	----------	17,604	17,604	215	17,819	----------	----------	----------	17,949
69 *	62	2023	17,508	158	----------	----------	17,350	17,350	93	17,443	----------	----------	----------	506
70	63	2024	17,412	17,412	----------	----------	0	0	93	93	----------	----------	----------	413
71	64	2025	17,310	17,310	----------	----------	----------	----------	93	93	----------	----------	----------	320
72	65	2026	17,214	17,214	----------	----------	----------	----------	63	63	----------	----------	----------	257
73	66	2027	17,118	17,118	----------	----------	----------	----------	63	63	----------	----------	----------	194
74	67	2028	17,016	17,016	----------	----------	----------	----------	50	50	----------	----------	----------	144
75	68	2029	16,920	16,920	----------	----------	----------	----------	50	50	----------	----------	----------	94
76	69	2030	16,824	16,824	----------	----------	----------	----------	50	50	----------	----------	----------	44
77	70	2031	16,722	16,722	----------	----------	----------	----------	22	22	----------	----------	----------	22
78	71	2032	16,626	16,626	----------	----------	----------	----------	22	22	----------	----------	----------	0
Total	----------	----------	1,475,042	153,320	586,206	466,687	268,829	268,829	36,546	305,375	586,206	----------	305,375	----------

[1] Includes revenues from the sale of a small amount of pumping energy at 30 mills per kilowatt-hour.

[2] Following a development period for each block of irrigation, the repayment ability of the irrigators has been based on 50 equal annual payments excepting the authorized Eden and Paonia projects which require 60 and 68 annual payments, respectively.

TABLE 1.—*Summary of initial units of Colorado River storage project and 12 participating projects*

Project and State	Lands to be irrigated		Generating capacity	Municipal water annually	Stream depletion annually	Construction costs					Repayment of reimbursable costs [2]		
								Reimbursable allocations					
	New	Supplemental				Total [1]	Nonreimbursable	Power	Municipal water	Irrigation	By water users [3]	By initial power units (Echo Park-Glen Canyon-central Utah)	Total
Colorado River storage project initial units:													
Echo Park unit, Colorado, Utah	*Acres*	*Acres*	*Kilowatts* 200,000	*Acre-feet*	*Acre-feet* 87,000	$176,426,000		$128,383,000		$48,043,000		$176,426,000	$176,426,000
Glen Canyon unit, Arizona, Utah			800,000		526,000	421,270,000		370,974,000		50,296,000		421,270,000	421,270,000
Subtotal, initial units			1,000,000		613,000	597,696,000		499,357,000		98,339,000		597,696,000	597,696,000
Recreation development of Dinosaur National Monument, Colorado, Utah						21,000,000	$21,000,000						
11 participating projects:													
LaBarge, Wyoming	7,970				14,200	1,673,300				1,673,300	$495,000	1,178,300	1,673,300
Seedskadee, Wyoming	60,720				110,400	23,272,000				23,272,000	4,785,000	18,487,000	23,272,000
Lyman, Wyoming		40,600			0	10,564,000				10,564,000	2,255,000	8,309,000	10,564,000
Silt, Colorado	1,900	5,400			5,800	3,356,000	73,600			3,282,400	1,020,000	2,262,400	3,282,400
Smith Fork, Colorado	2,270	8,160			7,500	3,367,000	24,000			3,343,000	1,045,000	2,298,000	3,343,000
Paonia, Colorado	2,210	14,830			9,000	6,944,000	152,400			6,791,600	2,414,000	4,377,600	6,791,600
Florida, Colorado	6,300	12,650			12,900	6,941,500	437,900			6,503,600	1,711,500	4,792,100	6,503,600
Pine River project extension, Colorado, New Mexico	15,150				28,300	5,027,000				5,027,000	2,045,000	2,982,000	5,027,000
Emery County, Utah	3,630	20,450			15,500	9,865,500	229,000			9,636,500	3,715,000	5,921,500	9,636,500
Central Utah (initial phase), Utah	28,540	131,840	61,000	48,800	189,400	231,044,000	5,991,000	46,699,000	$45,500,000	127,354,000	[4] 60,691,000	[5] 158,862,000	[6] 219,553,000
Hammond, New Mexico	3,670				7,900	2,302,000				2,302,000	370,000	1,932,000	2,302,000
Subtotal, 11 initial projects	132,360	233,930	61,000	48,800	400,900	304,356,300	6,907,900	46,699,000	45,500,000	199,749,400	80,546,500	211,401,900	291,948,400
Additional participating project authorized and under construction: Eden, Wyoming	10,660	9,540			32,400	7,287,000				7,287,000	1,500,000	5,787,000	7,287,000

Total, 12 participating projects	143,020	243,470	61,000	48,800	433,300	[7] 311,643,300	6,907,900	46,699,000	45,500,000	207,036,400	82,046,500	217,188,900	299,235,400
Grand total	143,020	243,470	1,061,000	48,800	1,046,300	[7] 930,339,300	27,907,900	546,056,000	45,500,000	305,375,400	82,046,500	814,884,900	896,931,400

[1] Exclusive of nonreimbursable CRDF expenditures.
[3] Costs allocated to power and municipal water are repaid with interest, including interest during construction.
[3] Repayment by water users toward construction costs over 50-year repayment period beyond a reasonable irrigation development period except 60-year period for Eden project and 68-year period for Paonia project.
[4] Includes $15,191,000 in irrigation revenues and $45,500,000 from municipal and industrial water users.
[5] Includes $27,838,000 of excess power revenues from the central Utah project power plants accruing during the irrigation repayment periods of this project.
[6] Exclusive of $5,500,000 allocable to purposes of the ultimate phase of central Utah project.
[7] Includes cost ($7,287,000) of authorized Eden project now nearing completion and $2,035,000 expended on Paonia project under previous authorization.

TABLE 2.—*Summary with additional units of Colorado River storage project and additional participating projects added to table 1*

Project and State	Lands to be irrigated		Generating capacity	Municipal water annually	Stream depletion annually	Construction costs					Repayment of reimbursable costs [2]		
								Reimbursable allocations					
	New	Supplemental				Total [1]	Nonreimbursable	Power	Municipal water	Irrigation	By water users [3]	By power	Total
Colorado River storage project: Subtotal initial units (table 1)	*Acres*	*Acres*	*Kilowatts* 1,000,000	*Acre-feet*	*Acre feet* 613,000	$597,696,000		$499,357,000		$98,339,000		$597,696,000	$597,696,000
Additional units:													
Cross Mountain, Colo.			60,000		70,000	50,225,000		36,329,000		13,896,000		[4] 50,225,000	
Curecanti, Colo.			40,000		18,000	49,305,000		41,205,000		8,100,000		[4] 49,305,000	
Flaming Gorge, Utah-Wyo.			72,000		56,000	82,942,000		52,042,000		30,900,000		[4] 82,942,000	
Subtotal			172,000		144,000	182,472,000		129,576,000		52,896,000		182,472,000	
Total storage units			1,172,000		757,000	780,168,000		628,933,000		151,235,000		780,168,000	
Recreational development of Dinosaur National Monument, Colo.-Utah (table 1)						21,000,000	$21,000,000						
Participating projects: Subtotal 12 initial projects (table 1)	143,000	243,470	61,000	48,800	433,300	311,643,300	6,907,900	46,699,000	$45,500,000	207,036,400	$82,046,500	217,188,900	299,235,400
Additional projects:													
Gooseberry, Utah		16,400			12,500	5,760,500	33,000			5,727,500	2,375,000	[5] 3,352,500	
Navaho, N. Mex.	137,250				341,400	[6] 211,237,300	1,298,000			209,939,300	30,730,000	[5] 179,209,300	
San Juan-Chama, N. Mex.		225,000		55,800	235,000	[6] 135,169,000	470,000		26,775,000	107,924,000	54,665,000	[5] 80,034,000	
Subtotal	137,250	241,400		55,800	588,900	352,166,800	1,801,000		26,775,000	323,590,800	87,770,000	262,595,800	
Total participating projects	280,270	484,870	61,000	104,600	1,022,200	663,810,100	8,708,900	46,699,000	72,275,000	530,627,200	169,816,500	[7] 479,784,700	
Grand total	280,270	484,870	1,233,000	104,600	1,779,200	1,464,978,100	29,708,900	675,632,000	72,275,000	681,862,200	169,816,500	1,259,952,700	

[1] Exclusive of nonreimbursable Colorado River development fund expenditures.
[2] Costs allocated to power and municipal water are repaid with interest, including interest during construction.
[3] Repayment by irrigation water users toward construction costs over a 50-year repayment period following a reasonable development period.
[4] A power rate of more than 6 mills would be required for these units to repay their construction cost in 50 years at 2.5 percent interest.
[5] Would require an extension of the payout period used in table 1 or an increase in the average power rate.
[6] $800,000 of the $36,400,000 estimated cost for Navaho Dam and Reservoir allocated to the San Juan-Chama project for added capacity necessary to serve the San Juan-Chama project.
[7] Exclusive of $5,500,000 allocable to purposes of the ultimate phase of central Utah project.

Senator O'MAHONEY. I offer for the record the statement of Senator Goldwater, of Arizona, to be printed in the record as though delivered.

STATEMENT OF HON. BARRY M. GOLDWATER, A UNITED STATES SENATOR FROM THE STATE OF ARIZONA

Senator GOLDWATER. Being a native of Arizona, it is only natural that I have come through life with a full realization of the need for and the value of water to our economy. In their consideration of the problems involved in this area, however, many people fail to grasp the essential facts of our situation because of their lack of familiarity with the background history of the Colorado River.

It is with this thought in mind, therefore, that I consider it worth while to make my remarks herein available, inasmuch as it has been my good fortune over the years to explore the whole river area and to acquire, as a result of such exploration, a rather intimate understanding of this particular aspect of God's natural creation.

For the most part, this statement will follow the lines of my remarks prepared in 1949 on this same subject.

First of all, it is necessary that we realize the immensity of this basin and the river that drains it. The basin comprises 244,000 square miles, all in the United States except 2,000 in Old Mexico.

The Salton Sea Basin has another 7,800 miles and is sometimes thought of as being a part of the Colorado River Basin, but as it does not drain into the Colorado, it can't truthfully be called a part of the main basin.

From Wyoming to Mexico the basin is 900 miles long and varies in width from 300 miles in the upper reaches to 500 miles in the lower basin.

To the northeast its boundaries are the Rocky Mountains and to the west the mighty Wasatch Range in Utah marks its size.

Way down at the bottom end of the lower basin the San Jacinto Mountains form a southwestern border for the basin.

In the basin we find elevations from 200 feet below sea level to over 1,300 feet above sea level, and vegetation commensurate with those extremes of altitudes.

Climates vary from dry, hot air of the deserts to the cold, crisp air of the mountains. Temperatures go from 50° below zero to 125° above zero.

Rainfall will be as low as 2½ inches in the desert to over 50 inches a year in the high valleys of the Rockies.

No similar area on earth can present such a variation in so many factors affecting human life as can this Colorado River Basin, and no comparable area can boast of a natural resource as powerful and undeveloped as this river to sustain and promote human life. Its 1,400-mile length has its head nestled in the clear lakes and glaciers of the Rockies and its feet in the warm waters of the Gulf of Lower California.

Compared to the age of the river and the basin, this argument about the use of its waters began only a fraction of a second ago. In this basin we find the oldest rocks known to man, over 2 billion years old, and the river itself has been wandering along in some shape or other for about 25 million years.

In the area where are located the headwaters of the Colorado and the Green, which are in the same chain of mountains, the Rockies, we find giant mountains of granite, lava, and sharply folded sedimentary rocks. Here is an area of undescribable beauty. Mountains that rear their heads into the sky, down whose sides tumble pure, cold streams of water teeming with trout; mountains whose perpetual snows and glaciers provide the bulk of the water the river system carries; mountains whose sides have been torn away by the streams to provide the rich earth of the valleys below; mountains whose forests and mines mean much to the economy of Wyoming and Colorado.

As we come down into the central part of this basin, we begin to find rocks of a different geologic origin. During the millions of years that this basin has existed, there have been several oceans that have covered this area or parts of this area. Through these seas would protrude high mountains, and against these mountains strong winds would blow just as they do today. These winds would carry away minute particles of these mountains in the form of sand and then the sand would settle into the sea and fall to the bottom.

There the tremendous pressures would compress these sands into layers of sandstones. When the oceans receded, vast areas of sandstones colored from soft pastels to vivid reds came to light.

At that time this river, which at first was a sluggish thing maybe 30 miles wide, started to work on these rocks. A gradual elevating of the lands more and more confined the river to a narrower channel and increased its cutting effect.

Today in this region we find, without doubt, the least explored, wildest part of the United States. An area of thousands of square miles cut by canyons hundreds of feet deep and varying in width from 3 or 4 feet to many miles.

An area into which few white men have traveled because of the lack of roads or incentive.

This is the country of the Navaho, the Ute, and the Hopi. An area of awe-inspiring formations of sandstones that has, as its potential, the greatest tourist attractions in the country. And now uranium.

We have been discussing the upper of the two basins, so now let's explore the other. This is the country of Nevada, eastern California, and Arizona, the lower basin. Here we find broad, flat valleys separated by low ranges of mountains. The valleys are filled with immense deposits of alluvial gravel and are fertile beyond man's fondest hopes.

There are the valleys that need but the touch of water to become immediately and profitably productive.

Here, too, are vast deserts. Some are unending stretches of delta sand, barren of even the smallest plant life. Others are really not deserts if compared to what you would think a desert should look like.

In Arizona some of these valleys I told you about are called deserts, but they are covered with a dense and interesting growth of cacti and small brush and trees, and present anything but a picture of the desert. In that part which is called the Imperial Valley, has on its eastern edge one of these vast sand deserts. In fact, it is the one you see in the movies when the foreign legion takes after the bad sheik. Imperial Valley was formed by the Colorado and its formation was so interesting that I must tell you about it.

The Gulf of lower California at one time extended far up the present river, probably to above Needles. The river, in the forming of its delta, gradually built a channel around this arm of the sea, and while this body of water was fed for a time from the river, finally that source cut itself off and the water eventually evaporated, leaving a large, deep valley whose floor is very fertile, but nearly 200 feet below sea level.

As a result of attempts to irrigate this valley with Colorado River water, the channel was so altered that when the disastrous floods of 1905 and 1906 came down the Gila and the Colorado they started to pour themselves into the Imperial Valley. That flood of water was finally stopped, but not until the present Salton Sea was formed.

Below Imperial Valley the delta of the river starts, and today, as a result of the building of dams up above, we find clear blue water flowing out to the sea where a silt-laden stream once pushed itself mile after mile down the valleys of Arizona and California to form an intricate delta pattern. This delta building action is not taking place any more because of these dams and the removal of the silt.

Instead of a delta as such, the river now flows to the Gulf through a well defined channel. The land in this area is in Mexico, and, like the bottom lands in other parts of the basin, is very fertile.

In this past discussion I have tried to cover briefly a description of the geography, geologic history, and the scenery of this basin. Those things took place so many millions of years ago that we can hardly even comprehend such vast time, but the written history of this stream and this basin is an interesting one, and an understanding of it will facilitate your consideration of its problems.

As the result of an exploration made by Cabeza de Vaca, which went from the vicinity of the delta of the Mississippi to Mexico City and lasted from 1528 to 1536, and which brought to the latter city tall tales about fabulously rich cities to the north, the exploration of the Southwest began.

Cortes, who was the Spanish leader in Mexico then, and who was no man to turn down the chance of easy gold, started sending parties out in 1539. It was one of these explorers, Ulloa, who first saw the mouth of the Colorado. He was trying to determine if Baja California was a peninsula or an island.

On coming near the mouth of the river he witnessed the giant tidal bore that occurs there twice a day and decided to end his investigations.

In the following year, 1540, the greatest conquest of all started. That was the Coronado Expedition, which went in 2 parts, 1 by sea, under command of Alarcón, and the other by land, under Coronado himself.

Alarcón sailed some 80 leagues up the river, according to his dairy, which put him some distance past the present city of Yuma. That, we can say, then, was the discovery of this river.

But even when the white man discovered it, he found that the Indian had been using its waters for protection and farming for many years before. Man has lived from, and on, this river for over 20,000 years.

We are further indebted to the Coronado Expedition for the discovery of the Grand Canyon in 1542, when one of his lieutenants,

Cardenas, was led there by the Moqui, or, as we now know them, the Hopi. The Coronado Expedition made deep explorations into the lands to the east and north, but returned to Mexico City emptyhanded as far as riches went. They returned without material riches, but they gave to the world the richness of the knowledge that these lands that now form our basin existed.

In the next 250 years, many Spanish explorations came into the basin area, some came looking for gold or silver, while others came to spread the work of God. These men, explorers, merchants, and padres alike, depended on the river and its tributaries for transportation and sustenance and we find many references in old Spanish chronicles to the Colorado River and the Gila.

This old river has carried over 5 different names in its life, and it was not until the last 200 years that Colorado began to emerge as its name, Colorado, red color.

In the early 1800's men began to work the river and its tributaries for beaver, and we find in that period many Americans beginning to explore this basin for its mineral, agricultural, and other natural wealths.

In 1869 the first complete study and exploration was started on the river system by Maj. John Wesley Powell, a one-armed Civil War veteran who, in May of that year, set out from Green River, Wyo., in 4 boats with 10 men, to drift down these rivers of mystery.

I have not gone into the river with much detail up to here, for I want a vehicle on which to carry you, and now that I have it with Major Powell's party, let's go downstream.

The Green River rises in the Wind River Mountains of southwestern Wyoming, emerging from a glacier and small lake over 13,000 feet above sea level. It flows over through a corner of Colorado through the Dinosaur National Monument, then into Utah. It has been in the mountain country up to here, but when it gets into Utah a ways, it runs into the first of the sandstones I mentioned before.

Here, with the exception of a few places, the river becomes confined in canyons for the rest of its trip to Lake Mead. Where one of these canyons end and another starts, the Green River enters the Colorado.

I mentioned the Green first because until 1922 the Colorado was considered as being formed by the junction of the Green and the Grand here at the head of Cataract Canyon.

In 1922 the Legislature of Colorado changed the name of the Grand to the Colorado, so if you are asked today where that river rises, you must say in Grand Lake on the western slopes of the Rockies, about 100 air miles northwest of Denver.

This newly named Colorado flows down through deep, rugged canyons, through wooded lands, and over flat green meadows to meet with the Green River here at this point. At the southern end of this canyon we find Dark Canyon Dam site.

Below here the river is joined by the Dirty Devil River whose name has been changed to Fremont to honor Gen. John Fremont, who can list among his many honors that of having been Governor of Arizona.

Below that point the river enters its most beautiful canyon, Glen Canyon. It stays in this canyon for nearly 200 miles, and during its course through here is joined by the Escalante River, which drains

the vast Escalante Desert, and the San Juan River, which rises in Colorado, runs through New Mexico, and flows across the southern part of Utah—the last 90 miles through a wondrous canyon system of its own.

This river brings down much of the red silt from the Navaho country that gives the river its name of Red. Near the mouth of Glen Canyon we come upon another important dam site which, when built, will back water up through the entire course of Glen Canyon. The water through here flows very placidly and one finds no rapids. Throughout this canyon one is confronted with historic spots marking the advent of the Spaniard and of the American. It is truly one of the most interesting stretches of the river as it winds its way through this wide and shallow red sandstone walled canyon.

Below Lee Ferry, which is the end of Glen Canyon, and the start of Marble Canyon, and also the boundary between the upper basin and the lower basin, the river plunges into the greatest of its canyon-cutting efforts. Marble Canyon actually is a part of the Grand Canyon, but as there is a definite line of demarcation at the place where the Little Colorado comes in, we treat it as a separate canyon.

For 64 miles the river cuts into the flat plateau to a depth of nearly 4,000 feet. The canyon is extremely narrow, never more than a mile in width. Here the river drops nearly 600 feet, or about 10 feet to the mile, thus creating many rapids.

At the end of Marble Canyon the Little Colorado, rising in eastern Arizona, comes into the big river and here, too, the Grand Canyon officially starts. For 230 miles this canyon, a mile deep, and at places 11 miles wide, twists and turns through the Kaibab Plateau and the little known area of northwestern Arizona.

We pass here Bridge Canyon Dam site which is of paramount importance to us in Arizona. Here is to be located the giant dam that will furnish power to lift the water from Lake Havasu into the central Arizona project aqueduct, and thereby furnish badly needed supplemental water for present irrigated lands in central Arizona. This dam will also furnish power to run our expanding industries in Arizona.

Immediately below that point, the river ends its wild plunge from the mountains of Wyoming and Colorado as it backs up behind the mass of Hoover Dam, forming Lake Mead. Near the headwaters of Lake Mead we come upon graphic evidence of the silt problem this powerful river presents us with.

I have not emphasized silt before, awaiting our arrival at this place to tell you about it.

This river, as it cuts through the sandstones and the granites and other rocks that make up its bed, and as its tributaries bring in their loads of erosion material, accumulates enough silt to fill 10,000 boxcars in a single day. This carrying power of the river has built the large delta of the river and, as I pointed out before, has been responsible for the creation of the Imperial Valley. This silt problem is recognized as the remaining large problem of the river. Its floods are largely controlled by the dams built, but additional silt regulation must be provided for.

In addition to this, soil conservation methods have been instituted on the Navaho and Hopi Reservations which, if carried through, will

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aid materially in removing the threat of this danger that, if allowed to go unchecked, will impair the efficiency of the planned and existing projects in the years to come.

The Colorado River below Hoover Dam runs into another great project that is now giving to the people of the Southwest its small portion of the tremendous unused resources of the river. This is Davis Dam. Below Davis Dam the river is well out into the valley and desert country and before it even has a chance to enjoy this, it backs into Havasu Lake, formed by Parker Dam.

This lake furnishes Los Angeles with a water supply that will more than take care of any anticipated growth in the years ahead.

It will also furnish the central Arizona project with water. Here the tributary river, called the Bill Williams, comes in from Arizona. This stream drains the western part of Arizona.

A small diversion dam immediately below Parker Dam diverts water onto the Colorado Indian lands that figure prominently in the rehabilitation of the Navaho and Hopi Indians.

As we go on down this river, we pass the city of Blythe, Calif., in the center of a fertile and well-developed irrigation project.

On down below here, and just above the city of Yuma, Ariz., the river is diverted by the Imperial Dam into the giant All-American Canal, which irrigates the entire Imperial Valley and supplies so much water that it cannot all be used and is wasting into the Salton Sea to such an extent that it is inundating farms and even buildings.

On the east of this dam, water is diverted to irrigate the new project on the Yuma Mesa, and the growing Wellton-Mohawk project.

From this dam to the sea is a matter of seventy-odd miles where the river flows almost entirely through Mexico.

The Gila River, one of the Colorado's largest tributaries, enters the main stream just below Imperial and Laguna Dams. This river is a sizable system in its own right, rising in New Mexico and flowing through Arizona where it adds to its waters those of the San Pedro, the Santa Cruz, and the Salt Rivers.

Senator O'MAHONEY. The committee will stand in recess until 2:30.

(Thereupon, at 1:05 p. m., the subcommittee was recessed, to reconvene at 2:30 p. m., same day.)

AFTERNOON SESSION

The hearing was resumed at 2:30 p. m., upon the expiration of the recess.

Senator ANDERSON. Senator Kuchel, do you have some introductory remarks?

Senator KUCHEL. Yes, Mr. Chairman.

I am glad now to present Mr. Northcutt Ely of Washington, D. C., who is special counsel for the Colorado River Board of California, and who, over the years, has represented the attorney general of California and other agencies, public agencies, in our State, on problems related to water. He is accompanied here today by Mr. Robert L. McCarty, a member of his firm.

Mr. Ely will discuss the pending legislation.

Senator ANDERSON. All right, Mr. Ely.

STATEMENT OF NORTHCUTT ELY, SPECIAL COUNSEL, THE COLORADO RIVER BOARD OF CALIFORNIA

Mr. ELY. Mr. Chairman, my name is Northcutt Ely. I am an attorney, with offices in the Tower Building, Washington 5, D. C., and appear here as special counsel to the Colorado River Board of California, a branch of the State government.

California, as a party to the Colorado River compact, and with heavy investments made under the Boulder Canyon Project Act, is seriously affected by this bill in the respects which I shall outline. California is also a party to the pending suit in the Supreme Court entitled *Arizona* v. *California et al.*, No. 10 Original, October term, 1953, as are Nevada, Arizona and the United States. I have the honor to represent California in that action as an assistant attorney general of my State, under the direction of Attorney General Edmund G. Brown of California.

The Bureau of Reclamation and the upper basin States, in planning the project now before you, have made interpretations of the compact and the project act which we challenge in the pending Supreme Court action, and which have necessitated our motion to implead these States in that suit. The Supreme Court, on February 28, 1955, referred that motion to the special master, Hon. George I. Haight, whom it had previously appointed, with instructions "to hear the parties and report with all convenient speed his opinion and recommendation as to whether the motion should be granted."

I shall discuss the pending project, our own projects which are affected, the conflicting interpretations of the compact and project act upon which the existing lower basin projects and the proposed upper basin projects are respectively based, and the effect upon our very large investments if the pending upper basin project were built and operated in the manner proposed.

I. THE PENDING PROJECT

The Colorado River storage project is variously described in bills now before Congress, but all of them have the four following objectives:

(1) Authorization of the construction of 11 to 30-odd reclamation projects. The aggregate consumptive use of these projects, including the evaporation loss, is said to range from about 1 million to about 2 million acre-feet. These quantities, when added to about 2,500,000 acre-feet, said to be required by projects already constructed or authorized, would represent a total use of say 3,500,000 to 4,500,000 acre-feet in the upper basin. The larger of these figures is still within the quantity of 7,500,000 acre-feet per annum, the use of which is apportioned to the upper basin by article III (a) of the Colorado River compact. Moreover, the engineering studies indicate that this total could be put permanently to use without the construction of any new holdover storage whatever, and that no holdover storage would be required for nearly a half century, even if other projects were added.

(2) Nevertheless, these bills authorize the immediate construction of 2 to 6 storage reservoirs: Echo Park, Flaming Gorge, Glen Canyon, Cross Mountain, Navaho, and Curecanti. The ultimate storage program amounts to over 48 million acre-feet. These storage dams are

far downstream from the irrigation projects. They would not store water to be used on these projects. They would, instead, store the water which is not used on the irrigation projects in the upper basin, but which is destined for use in the lower basin and in Mexico. It is proposed that this lower basin water, so intercepted, be used to generate electric energy, the power sold, and the proceeds used to pay out the cost of the storage dams, and thereafter, starting 44 years from completion of Glen Canyon, to pay for the reclamation projects named in section 1 of the bill. The irrigation projects thus subsidized are called participating projects, and the subsidy is over 85 percent of their construction cost. The power would be sold to 10 privately owned utilities at a rate in excess of 6 mills per kilowatt-hour, in contrast with Hoover Dam, where 91 percent of the firm energy is sold to public agencies at a switchboard cost of about 2 mills per kilowatt-hour.

Senator ANDERSON. Are the figures comparable? Is this 6 mills a switchboard price?

Mr. ELY. That is not clear from the material here. I take it that it is a postage stamp rate available wherever the power may be taken.

Senator ANDERSON. Therefore, the two figures are not comparable?

Mr. ELY. That I cannot tell you, sir.

Senator ANDERSON. If it was a postage stamp figure, it is not comparable to the switchboard cost, is it?

Mr. ELY. You are correct to the extent it includes the transmission cost. Whether the 6 mills would be charged to a user near the dam is not clear.

(3) These bills all authorize; for example, S. 500, section 2, the future construction of other projects. These are not designated in the bill, but the Department of the Interior has inventoried over 100 projects in various publications, particularly House Document 419, 80th Congress. It is not clear from section 2 whether these projects must be brought back to Congress for further authorization, or whether the Secretary is authorized by section 2 to build them. Except as to two projects, the O'Mahoney-Millikin amendment to the Flood Control Act of 1944 is waived, and the Secretary need not submit his feasibility reports to the affected States for comment.

(4) When, as, and if the additional irrigation projects referred to in section 2 are built, it will be necessary to store water in downstream storage reservoirs, not for use by the reclamation projects—all of the storage reservoirs, as previously stated, are so far downstream that no water stored there can be used for irrigation or domestic purpose in the upper basin—but for quite a different reason: To enable these section 2 projects to increase the consumptive use in the upper basin above the 4,500,000 acre-feet required by existing projects plus all the section 1 projects, without violating the provisions of article III (d) of the Colorado River compact.

That article of the Compact stipulates that the States of the upper division (Colorado, Utah, New Mexico, Wyoming) will not cause the flow of the river at Lee Ferry to be depleted below an aggregate of 75 million acre-feet for any period of 10 consecutive years. In the driest decade so far, the flow at Lee Ferry was more than 100 million acre-feet, during a time when the upper basin projects were using about 2,500,000 acre-feet per year; and engineers tell us that the upper basin uses can safely rise to about 4,500,000 acre-feet (which is about

the total of existing uses plus all the uses of all the section 1 projects proposed in the most ambitious of these bills), before this 100 million total would shrink to 75 million.

Senator ANDERSON. Would you pause there? It is not an extremely important matter, and I do not wish to dwell on it, but the statement that you have that all these reservoirs are so far downstream that no water stored there can ever be used for irrigation or domestic purposes in the upper basin—and you mentioned the Navaho Dam, and that is above the Navaho-Shiprock project, so called. But I think the statement is true as to the vast majority of them.

Mr. ELY. Yes, your correction is in order, I think.

Senator ANDERSON. Thank you.

Mr. ELY. Thus the ultimate purpose of Glen Canyon Reservoir, and the other holdover storage reservoirs, is to enable the unnamed section 2 projects to be built in the upper basin at some remote time in the future without violating article III (d) of the compact.

The bills all make clear that this measure is intended to commit Congress to a program for the full utilization of all the water which the upper basin claims under the Colorado River compact. Such a declaration of policy appears in section 2. Otherwise, the storage reservoirs are not needed for any water conservation purpose, and are strictly power dams.

The total storage capacity proposed is enough to intercept the whole flow of the river for several years, and it is planned to hold over storage in these reservoirs for 20 to 35 years, or 5 to 9 presidential administrations. This is like holding back from the lower basin water which reached Glen Canyon in 1920 in order to release it to Hoover Dam in 1955. During the 50 years that these reservoirs will serve no necessary function except to generate power, they will evaporate some 30 million acre-feet of water. The evaporation loss from these power reservoirs will be over 600,000 acre-feet per year, enough for a city of 3 million people.

II. THE HISTORICAL BACKGROUND

The dispute, which brings us here and into the Supreme Court, turns primarily upon conflicting interpretations of the Colorado River compact and the Boulder Canyon Project Act, which, ironically enough, were themselves supposed to settle the conflict between the upper basin and the lower.

The chronology is as follows:

Developments prior to 1922

Irrigation in the lower basin developed much more rapidly than in the upper. Palo Verde Valley commenced irrigation in 1877; Imperial Valley's appropriations date from 1891; those of the Yuma project in Arizona from 1904. By 1916 the whole natural flow had been appropriated, and the river was dry for long periods in the summer at the Mexican boundary. Nevertheless, the spring floods, depositing great quantities of silt and raising the river bed several feet in some years, were an increasing menace to lands in Imperial Valley, lying below sea level, and to lands in the Yuma Valley in Arizona. Junior appropriators in the upper basin faced a probable lawsuit by senior appropriators in the lower basin. A great storage dam was a necessity not only for flood control, but also to make possible any

further development at all in either the upper basin or the lower, and for power generation.

But the upper basin, knowing that the lower had a 2-to-1 population ratio (now over 4 to 1), better lands, flatter contours, lower capital costs, and a longer growing season, rightly feared that if the floodwaters were stored, the lower basin would appropriate and use them, unless in some way the upper basin could be insulated against the law of priority of appropriation, which is "first in time, first in right." The United States Supreme Court, in 1922, in the case of *Wyoming* v. *Colorado* (259 U. S. 419), applied this rule on an interstate stream, regardless of State lines.

The Colorado River compact

The Colorado River compact was signed by representatives of all seven States at Santa Fe, N. Mex., November 24, 1922, subject to ratification by their legislatures and the consent of Congress, the latter being a constitutional requirement.

Article II defined the Colorado River system as including the main stream and its tributaries, the upper basin as being the drainage area above Lee Ferry, a point on the river in northwest Arizona, and the lower basin as the drainage area below that point. The 4 States of Colorado, Utah, New Mexico, and Wyoming were defined as the "States of the upper division" and the 3 States of Arizona, California, and Nevada as the "States of the lower division." The terms "division" and "basin" are not quite the same. Utah, New Mexico, and Arizona have areas in both basins.

The negotiators gave up any attempt to allocate all the water, or to allocate to individual States. They agreed on the idea of allocating "beneficial consumptive uses" instead of the flow of a stream, and made a general division as between upper and lower basins, leaving to the future any allocation to States as such. Nor did they attempt to dispose of all the water supply, leaving, as they thought, about 25 percent of it unallocated and untouched by the compact. The mechanics were as follows:

In article III (a) the compact apportioned in perpetuity the "beneficial consumptive use" of 15 million acre-feet per annum of the waters of the Colorado River system, one-half to each basin, to include any rights which "may now exist." This was the protection against the law of priority of appropriation demanded by the upper basin. As article II defined the system to include the tributaries, the apportionment in article III (a) includes the uses on the tributaries as well as on the main stream. The compact did not define the term "beneficial consumptive use."

Article III (b) permitted the lower basin to "increase its use" of waters of the system by 1 million acre-feet per annum.

These 2 paragraphs thus disposed of 16 million acre-feet per annum of which 15 million was insulated against the law of appropriation, basin versus basin, by a perpetual apportionment. A compact title to the other 1 million acre-feet could be obtained by "increase of use" in the lower basin, but not by apportionment irrespective of use.

These two paragraphs did not dispose of all the water available throughout the system. This total was estimated, in reports of the negotiators to Congress, as over 20 million acre-feet.

Article III (c) provided that if the American Government should recognize rights in Mexico, the Mexican burden should be met first out of any water in excess of the 16 million acre-feet, and if that was insufficient, the deficiency should be equally borne by the two basins. The four States of the upper division agreed to deliver water at Lee Ferry to supply one-half of the deficiency in addition to their obligation under article III (d).

In article III (d) the 4 upper States promised that they would not deplete the flow at Lee Ferry below 75 million acre-feet in any 10-year period.

Article III (e) provided that the States of the upper division would not withhold water, and the States of the lower division would not require the delivery of water, which could not reasonably be applied to domestic and agricultural uses.

Article III (f) provided that further equitable apportionment of the beneficial uses of the system unapportioned by paragraphs (a), (b), and (c) might be made after October 1, 1963, if and when the upper basin should have reached a beneficial consumptive use of 7,500,000 acre-feet per annum, or the lower basin 8,500,000 acre-feet.

Article III (g) provided the mechanics for calling such a future conference.

Article IV provided that water might be impounded for power generation, but "Such impounding and use shall be subservient to the use and consumption of such water for agricultural and domestic purposes and shall not interfere with or prevent use for such dominant purposes."

Article VII provided that "nothing in this compact shall be construed as affecting the obligations of the United States to Indian tribes."

Article VIII provided that "present perfected rights to the beneficial use of waters of the Colorado River system are unimpaired by this compact."

Article XI provided that the compact should become binding when ratified by the legislatures of all seven States and when Congress should give its consent.

Ratification by six States, rejection by Arizona

In 1923 all States but Arizona ratified. Her legislature rejected the compact, after one house or the other had adopted reservations excluding the Gila River and subjecting all power development to a $5 per horsepower royalty.

In 1925, at the suggestion of Colorado, the other 6 States ratified it again, as a 6-State document, waiving 7-State ratification, and presented it to Congress in that form.

The Boulder Canyon Project Act

The Boulder Canyon Project Act was enacted in December 1928, but section 4 (a) provided that it should not take effect unless, at the end of 6 months, the President should proclaim either that the Colorado River compact had been ratified by 7 States, or, failing that, had been ratified by 6 States including California, and, in the latter event, California's Legislature had enacted a statute, in terms prescribed by Congress, limiting California's rights in the Colorado River. The upper basin, in other words, had demanded in 1922 a seven-State compact as the price for the construction of Hoover Dam. Failing to get

Arizona's ratification, they demanded (and got) a second price from California: the enactment of the Limitation Act, to avoid the possibility that California and Nevada might use all the water apportioned to the lower basin, and that Arizona would "raid the river" outside the Compact, i. e., establish priorities against slower upper basin development.

The Boulder Canyon Project Act, in granting consent to a 6-State compact, cut across the 7-State compact in several particulars, in addition, of course, to the change in the number of parties.

Whereas the 7-State compact made no allocations to individual States, but only to basins, the project act recognized California's right to specified quantities—and required her to limit herself thereto—that is, 4.4 million acre-feet of the waters apportioned by article III (a), plus one-half of the excess of surplus waters unapportioned by the compact. As to the latter, whereas the compact, in article III (b), had recognized the lower basin's right to appropriate 1 million acre-feet of surplus, the project act recognized California's right to appropriate one-half of the excess or surplus, which might be more or less than 1 million acre-feet. The project act makes no specific reference to article III (b). The compact did not define "consumptive use," but the project act did, as "diversions less returns to the river." Whereas article IV (c) speaks of State "regulation and control," the project act, in section 5, directed that no one should have the use of stored waters except by contract with the Secretary, but directed him to make contracts in accordance with the Limitation Act; that is, in accordance with section III (a), and section 6 directed him to use the reservoir, among other purposes, for satisfaction of present perfected rights in pursuance of article VIII of the Colorado River compact. (For brevity, the term "appropriation" is used throughout this discussion as including not only rights acquired by appropriation under State law, but rights in waters stored by the United States acquired or confirmed by contract with the United States.) Elsewhere, in section 13, the statute subjected all rights of the United States and of those claiming under it to the compact. Whereas article IV of the compact had declared the Colorado River to be nonnavigable, sections 1 and 6 of the project act directed the dam and reservoir to be used in aid of navigation and flood control.

California passed the required Limitation Act in 1929 to take effect only in the absence of 7-State ratification. The resulting agreement with Congress is referred to in our discussions as the statutory compact between the United States and California, to distinguish it from the Colorado River compact.

The President, on June 25, 1929, proclaimed the failure of 7-State ratification, and the completion of 6-State ratification.

The 6-State compact and the project act thereupon became effective, authorizing the construction of Hoover Dam and the All-American Canal, on the further condition that the beneficiaries contract in advance to repay their cost. Water and power users in California did so in 1930–34. The water contracts now under attack by Arizona in Supreme Court disposed of 5,362,000 acre-feet per annum, equal to 4.4 million acre-feet of water available under article III (a) of the Colorado River compact, and about 1 million of "excess or surplus" available in accord with the Limitation Act.

III. THE PROJECTS PAID FOR BY CALIFORNIA

California is deeply concerned by this proposed interception of the water supply upon which projects costing the people of this State more than a half billion dollars are dependent.

From north to south, these are:

(1) Hoover Dam, whose cost was underwritten by the water and power users of southern California under the authority of the Boulder Canyon Project Act, plus the transmission lines built by California agencies to bring Hoover Dam power to the people in this State (Arizona and Nevada subsequently withdrew 36 percent of the power underwritten by California power contractors);

(2) Parker Dam, about 155 miles below Hoover Dam, paid for by the Metropolitan Water District of Southern California;

(3) The Colorado River aqueduct, built and paid for by the Metropolitan Water District, which carries Colorado River water over 300 miles from Parker Dam to some 60 cities and districts on the coastal plain, of which the largest are Los Angeles and San Diego;

(4) The Palo Verde Irrigation District, an area about 212 miles below Hoover Dam, which has the oldest rights on the river and has been diverting water there since about 1877;

(5) The All-American Canal, which diverts water at Imperial Dam, 303 miles below Hoover Dam and 22 miles above the Mexican border, and transports it into the Imperial Irrigation District and Coachella Valley County Water District. This dam and canal were built by the United States, along with Hoover Dam, as part of the Boulder Canyon project, but these districts were required to underwrite the cost in advance. Imperial Valley's appropriations date back to 1891.

I have omitted from this tabulation the Headgate Lock Dam and the Davis Dam, because their cost was not underwritten by California. I might have included Laguna Dam, because we paid for that, although it served only Arizona.

The quantity of Colorado River water which California claims, for which her public agencies hold contracts with the United States, and which the Colorado River aqueduct, the All-American Canal, and the Palo Verde works have been built to use, is 5,362,000 acre-feet per year. California is not seeking more water for new projects, but to defend the water supply of these three old projects.

More than 5 million people live within the areas served by the Colorado River in California. The assessed valuation exceeds $12 billion. The economy of southern California is dependent on the permanent availability of these waters. California could, in fact, use a great deal more than this, if it were available. The Metropolitan Water District will outgrow its present Colorado River supply, which is 1,212,000 acre-feet per year, in about 25 years on present forecasts, and must look elsewhere for additional water.

These works were built in reliance upon the Colorado River compact and the Boulder Canyon Project Act.

The meaning of both these documents is now in sharp controversy in the Supreme Court in *Arizona* v. *California et al.*, in respects which affect the measure now before you, in the following way:

IV. INTERPRETATIONS OF THE COLORADO RIVER COMPACT INVOLVED IN THE UPPER BASIN STORAGE PROJECT LEGISLATION AND THE PENDING LITIGATION

I am taking these up in the order in which they first appear in the Colorado River compact and not necessarily in the order of first importance, although this first one happens to be a very important one.

1. The method of measurement of consumptive use

Article III (a) of the Colorado River compact, in a single sentence, apportions from the Colorado River system in perpetuity to the upper basin and to the lower basin, respectively, the exclusive beneficial consumptive use of 7,500,000 acre-feet per annum, which it states shall include all water necessary for the supply of any rights which may now exist. Manifestly this one sentence must have the same meaning in both the basins to which it refers. But there is sharp controversy over the meaning of the term "beneficial consumptive use." The question is whether it means the quantity in fact used, measured at the place of use, or whether it means the effect of that use measured in terms of stream depletion at some point hundreds of miles downstream, in this case Lee Ferry. The same question arises under the Mexican Water Treaty's so-called escape clause.

This question of interpretation of the Colorado River compact and the Mexican Water Treaty is directly at issue in the present Supreme Court cases. The quantity involved in this dispute, so far as the planning of the upper basin storage project is concerned, is 300,000 to 500,000 acre-feet per annum, according to engineers' estimates. The Reclamation Bureau assumes that the measurement is to be in terms of downstream depletion in the case of the upper basin project, but in terms of diversion minus return flow, measured at the place of use, with respect to California. The Boulder Canyon Project Act (sec. 4 (a)) defines it in the latter terms, and the Mexican Water Treaty says (art. I (j)):

> "Consumptive use" means the use of water by evaporation, plant transpiration, or other manner whereby the water is consumed and does not return to its sources of supply. In general it is measured by the amount of water diverted less the part thereof which returns to the stream.

That corresponds with California's allegation of the meaning of the term in *Arizona* v. *California* (answer to Arizona, par. 8). Arizona denies that this definition applies to her uses (reply, par. 8), and the Reclamation Bureau, in the project before you, assumes that it does not apply to the upper basin, although the projects to be built under these bills are recognized as being subject to the terms of the Mexican Water Treaty (e. g., S. 500, sec. 12).

Another problem arises if the depletion theory prevails. One of its postulates is that when water is stored in a reservoir, the stream below is depleted, and therefore that the consumptive use takes place then and there, in the year when the water is put in storage, not when it is taken out and used. On that premise, to what years is the 48 million acre-feet of holdover storage, i. e., of stream depletion, to be charged? And, in future operations, how is the storage of more than 7,500,000 acre-feet in any one year to be charged? Is the same principle, whatever it may be, applicable to the lower basin reservoirs?

2. The meaning of "per annum" in article III

Article III (a): Does the apportionment of the use of 7,500,000 acre-feet "per annum" mean an average of that amount over a period of years, or a maximum in any one year? Manifestly, as in the interpretation of "consumptive use," the compact must be given the same interpretation in both basins.

The Reclamation Bureau, in submitting this upper basin storage project, makes the assumption that the apportionment means an average over an extended period, apparently 35 years or more. The effect of this theory is that the upper basin may use, say, 9 million acre-feet or more of water in one year, and consider it as apportioned under article III (a), if it uses, say, 6 million or less in some other years, to average 7,500,000 acre-feet.

California alleges in the pending lawsuit that the apportionment means a maximum, like a speed limit on a highway, not an average. If the speed limit says 50 miles per hour, that doesn't mean an average of 50. We allege (answer to Arizona, par. 8) that the words "per annum" in the compact mean "each year," and not an average of uses over a period of years, whether they are our uses or anyone else's. Arizona admits this, but says that the issue is not yet material in the lower basin (reply, par. 8).

The effect, if California is right, is that if the upper basin should use in a given year any quantity in excess of 7,500,000 acre-feet, it is using that excess out of unapportioned surplus, in competition with the appropriations of unapportioned excess or surplus waters which may have been made in the lower basin, and subject to the Mexican treaty burden, which, under article III (c) of the compact, is to be first supplied out of surplus. The amount involved in this particular issue is very large of the order of 1,250,000 acre-feet per year. That is, if the compact means what we think it means, the Reclamation Bureau is in error that much in its assumptions as to the quantity of water which the upper basin can lawfully claim under article III (a), and, by the same token, that much more water must be let down to satisfy the Mexican Water Treaty and prior appropriations of surplus in the lower basin. The same problem arises in the lower basin, but there the Reclamation Bureau has assumed that the limitation imposed upon California's uses by the Boulder Canyon Project Act is a maximum, not an average; so also with its assumptions as to the deliveries to be made under the Mexican Water Treaty and the amounts to be delivered under its water contracts with Arizona, California, and Nevada.

Both assumptions cannot be correct.

This problem of whether the apportionment under article III (a) is of an annual amount, or of an average available over a 20- to 35-year period, has no relation at all to the guaranty in article III (d) that the States of the upper division will not deplete the flow at Lee Ferry below 75 million acre-feet in each 10 years. That problem is discussed below in connection with the Mexican treaty burden.

3. "Rights which may now exist"

Article III (a): Does the statement in article III (a) that the apportionment of the use of 7,500,000 acre-feet per annum "shall include all water necessary for the supply of any rights which may now exist" include two categories or uses in dispute in *Arizona* v. *Califor-*

nia: (1) the uses on the lower basin tributaries, particularly those of Arizona on the Gila River, which she says are not to be charged against the lower basin's apportionment of III (a) water, and (2) Indian uses in both basins? The significance of the Gila appears in connection with the upper basin's obligations under article III (c) and III (d) of the compact, and that of the Indian uses in connection with article VII, and will be outlined when those articles are reached in numerical order.

4. The lower basin's rights under article III (b)

Article III (b) of the compact permits the lower basin "to increase its beneficial consumptive use" by 1 million acre-feet per annum. Arizona says that this is an "apportionment," good in perpetuity against the upper basin. California says that it is not an apportionment, but a license to appropriate. Arizona says all the III (b) water is in the Gila. California says that article III (b) is applicable to the main stream and all the tributaries in the lower basin.

5. The guaranties in articles III (c) and III (d)

Article III (c) provides that the Mexican burden, which is a minimum of 1,500,000 acre-feet per annum measured at the border (and more than that, measured at Lee Ferry), shall be borne first out of surplus, over amounts specified in articles III (a) and III (b) and, if that is insufficient, that the burden of the deficiency shall be equally borne by the upper basin and the lower basin, and whenever necessary the States of the upper division shall deliver at Lee Ferry water to supply one-half of the deficiency, in addition to that provided in article III (d).

Article III (d) provides that the States of the upper division, i. e., Colorado, Utah, Wyoming, and New Mexico, will not cause the flow of the Colorado River at Lee Ferry to be depleted below an aggregate of 75 million acre-feet for any period of 10 consecutive years.

The interpretation of these two clauses is at issue in *Arizona* v. *California* and is involved in the present bill. The Reclamation Bureau apparently assumes in its presentation here that there will be available at Lee Ferry, after the section 2 projects are built, only about 75 million acre-feet every 10 years. Arizona says (Reply, par. 8, 11) that all this 75 million is III (a) water, that is, that this figure is merely 10 times the quantity apportioned to the lower basin by article III (a) of the compact, and that all of the lower basin's III (a) uses can be made from the main stream. California (Answer to Arizona, par. 8, 11) and Nevada (Petition, par. XIV) deny this, and say that Arizona's uses on Gila, and the uses of Nevada and Utah on the Virgin River, are "rights which may now exist," in the language of article III (a), hence chargeable to (and protected by) article III (a). That would include also New Mexico's uses on the Gila.

Arizona retorts that her uses on the Gila are covered by article III (b) of the compact, an article which says that, in addition to the apportionment in article III (a), the lower basin is given the right to increase its beneficial consumptive use by 1 million acre-feet per annum. If Arizona is sustained by the Court in this position, there is no water for Mexico in the 75 million acre-feet at Lee Ferry referred to in article III (d), and the upper basin, under article III (c), must, in addition, release water to supply one-half of any deficiency in meet-

ing the Mexican burden. When the Reclamation Bureau reported favorably on the central Arizona project, it was on the assumption that Arizona's interpretations were correct, without, however, endorsing them. If California and Nevada are correct, a portion of the 75 million acre-feet at Lee Ferry referred to in III (d), equal to the total of the water supply available and used on the Gila, Virgin, and other tributaries under III (a), is excess or surplus water unapportioned by the compact, available in part for the service of the Mexican Water Treaty and in part for appropriation, contract, and use in the lower basin.

We view the 75 million as a minimum of "wet water," unclassified and unrelated to article III (a), and to be met whether or not there remains available to the upper basin, after meeting that obligation, water to sustain a maximum use of 7,500,000 acre-feet per annum of water apportioned by article III (a).

On the other hand, the upper basin view appears to be that the compact means that if the upper basin lets down 75 million acre-feet in each 10-year period, it is entitled to keep and use what is left. Moreover, the view of some upper basin spokesmen apparently now is that the covenant in article III (d) is not a guaranty at all, and that the apportionment to the upper basin in article III (a) takes precedence over it. We vigorously challenge that interpretation.

6. The right to demand or withhold water

Article III (e) of the Colorado River compact provides that the States of the upper division shall not withhold water, and the States of the lower division shall not require the delivery of water, which cannot reasonably be applied to domestic and agricultural use.

Article IV (b) provides that the impounding and use of water for power generation shall be subservient to the use and consumption of water for agricultural and domestic purposes.

Glen Canyon Reservoir and the other proposed upper basin mainstream reservoirs will be so located, physically, that no water stored therein can ever be applied to domestic or agricultural uses in the upper basin.

I should correct that with respect to the Navaho, Senator Anderson.

All of the water stored in such reservoirs will be required for domestic and agricultural use in the lower basin and Mexico.

It seems to be the position of the upper basin States that the water which escapes consumptive use in the upper basin may be impounded downstream at Glen Canyon or other dams, and withheld there for power generation, even though required for irrigation and domestic use in the lower basin, so long as 75 million acre-feet are allowed to flow past Lee Ferry in each 10-year period. We deny this, and say that under articles III (b), III (e), and IV of the compact, water appropriated in the lower basin, even though excess or surplus waters, may not be withheld from us, in the upper basin, for the generation of power.

On some of these points, it was refreshing to read the candid statement of Gov. Ed Johnson, of Colorado, released December 20, 1954. After quoting from the reports of the compact negotiators to Congress and the legislatures in 1923, Governor Johnson said:

> I am compelled to keep emphasizing that whatever water is stored in the Glen Canyon and Echo Park Reservoirs will be surplus to the agricultural and

domestic needs of the upper basin, and must be delivered to the lower basin to satisfy the award of 1.5 million acre-feet to Mexico and 1 million acre-feet to the lower basin. Furthermore, should the lower basin require an additional supply of water for agricultural and domestic purposes the water stored in these reservoirs must be released.

Under the 7-State compact the upper States must deliver at Lee Ferry in each 10-year period 75 million acre-feet to the lower States and 7½ million acre-feet to Mexico before they can use one drop of water themselves beyond what they used before the 7-State compact was ratified. In the current 10-year period that will leave only 3,250,000 acre-feet per year for their total use. In the previous 10-year period they would have had 4,150,000 acre-feet a year. In 1902 the upper basin States under this formula would have had no water at all.

The project is planned by the Reclamation Bureau on just the opposite of Governor Johnson's assumptions: namely, the claim of a right to deprive the lower basin of all waters in the main stream in excess of 75 million acre-feet in each 10-year period, which is about 25 percent less than the expectation under the interpretations of the Compact and Project Act on which this same Reclamation Bureau relied in making water and power contracts in the lower basin, and in recommending the Mexican Water Treaty to the Senate.

7. Appropriation of surplus

Article III (f): Does the provision for a further apportionment, by unanimous consent after October 1, 1963, mean that no State may validly appropriate surplus until a new compact is made? California alleges, in the pending litigation, that any State, including the upper basin States, may appropriate surplus waters unapportioned by the compact, subject only to their being divested by a new compact to which such a State is party, or by court decree.

Arizona and Nevada say that no State may acquire any right in surplus until a new compact is made. If they are sustained, then the upper basin can acquire no right in the waters it may use in any year in excess of 7,500,000 acre-feet. Actually, under the compact, the Boulder Canyon Project Act and the Mexican Water Treaty, all excess and surplus water of the Colorado River system has already been appropriated or obligated to uses in the lower basin and Mexico.

8. Indian rights

Article VII of the Colorado River compact provides that nothing in the compact shall be construed as affecting the obligations of the United States to Indian tribes. The upper basin compact (art. VII) provides that use by the United States or its wards shall be charged as a use by the State in which the use is made. California, in the pending suit, takes the same position (answer, par. 14).

The United States denies this (petition of intervention, par. XXXVII), and says that "the rights to the use of water of the Indians and Indian tribes are in no way subject to or affected by the Colorado River compact." The Government's petition tabulates (appendix II) 1,747,250 acre-feet of diversion claims of Indians in the lower basin, of which 1,556,250 are in Arizona. There are Indian claims in the upper basin not tabulated in the petition, to diversion rights exceeding 1 million acre-feet per year.

Arizona says (reply, par. 1) that—

the obligations of the United States to the Indians or Indian tribes are not material or relevant * * *

It is known that the Office of Indian Affairs construes article VII of the compact as meaning that (1) the Indian claims come ahead of the compact, are not chargeable to any State, and the compacting States simply divided the residue after the Indian claims; (2) Indian claims relate back to the date of establishment of the reservation, even though not put to use, and take priority over uses by non-Indians even though the uses by non-Indians may in fact long antedate the actual putting of water to use by the Indians. The Government's pleadings leave it free to make both these assertions. As to the first, Arizona has refused, so far, to disagree with the Indian Bureau's position. Naturally, if Arizona can hope for 1.5 million acre-feet for Indian diversions, outside the compact, in addition to the 3.8 million acre-feet she demands under the compact, there is a temptation to try to get it. Just where the water would come from is not very clear.

Arizona, at a meeting with the Attorney General of the United States on December 3, 1953, was invited to join the upper basin States, California and Nevada in a common statement of position that Indian uses are to be charged under the compact against the State in which they are situated, but declined to do so.

I might add that at the first proceedings before the master on August 5 of this year, the same issue arose and again remained unanswered.

The existence of the Indian claims, and uncertainty as to their accounting, raises serious questions as to the water supply for the projects in both the upper and lower basins. The United States, in this suit, also claims independent rights for the use of the Bureau of Land Management, the Forest Service, the Park Service, for fish and wildlife, and so forth, and denies that all of its rights are subject to the Colorado River compact. The magnitude of these additional claims is not stated.

Those questions will not be resolved until this suit is decided.

9. Present perfected rights: Quality of water

Article VIII provides that "present perfected rights to the beneficial use of waters of the Colorado River system are unimpaired by this compact." In the present suit California alleges (answer to Arizona, par. 15) that "unimpaired" as used in this article means unimpaired as to both the quantity and the quality of the waters to which these perfected rights relate. California alleges that, as of the effective date of the compact, her present perfected rights were not less than 4,950,000 acre-feet (answer to Arizona, par. 28).

Senator ANDERSON. Perfected?

Mr. ELY. Present perfected rights. I should say that Arizona admitted present perfected rights in California of approximately 3 million acre-feet per annum measured by depletion, which is the equivalent of a larger quantity measured by diversion less return flow.

The report of the Reclamation Bureau contains no data on the effect of large transmountain diversions coupled with other upper basin uses on the quality of water. Such a study should obviously be made. We know that when the compact was ratified, the report of the Colorado commissioner, Delph Carpenter, stated that—

> natural limitations upon the use of the waters within each of the upper States will always afford ample assurance against undue encroachment upon the flow of Lee's Ferry by any one of the four upper States. Colorado cannot divert

5 percent of its portion of the river flow to regions outside the river basin (Hoover Dam documents, H. Doc. 717, 80th Cong., p. A79).

Elsewhere it was testified at that time that Colorado's feasible transmountain diversions could not exceed 300,000 acre-feet per annum. By contrast, the Colorado transmountain diversion projects inventoried in the Reclamation Bureau's various reports aggregate 2 million acre-feet, or over 50 percent of the water allocated to Colorado by the upper basin compact. There would be that much less water to absorb an increasing quantity of salts in passage to Lee's Ferry. The effect on the lower basin is one which the lower basin States are entitled to have studied and reported upon, to the end that their present perfected rights, in the language of article VIII, shall remain unimpaired.

Senator ANDERSON. Before you leave that, you heard my questioning of Mr. Matthew this morning about the Fryingpan-Arkansas. His position was that California was opposed to all diversions outside the basin. Is it still there that way?

Mr. ELY. We feel that before any major transmountain diversions are authorized, this question of quality of water should be thoroughly explored. The Arkansas-Fryingpan project as authorized in the pending legislation (S. 300, I believe) involves a small quantity of water, something under 100,000 acre-feet. However, it is the forerunner and first unit of a 900,000 acre-foot diversion.

When we testified—I testified with Mr. Matthew on the Fryingpan-Arkansas project before this committee in the spring of 1953—the Colorado River storage project had not at that time been recommended by the Bureau of the Budget, and we did not oppose the Fryingpan-Arkansas project. We called attention to its implications; that when the 900,000-acre-foot phase of the project was brought back to Congress we might have to do so. We asked for a study of this quality of water question. Your committee kept the Fryingpan bill for several months. In the meantime, the Colorado River storage project was cleared by the Bureau of the Budget. Consequently, we are now faced with this problem of large transmountain diversions. The effect is primarily with respect to the quality of water.

Senator ANDERSON. Would that reverse your position or keep it the same?

Mr. ELY. No. I would say that it is the same, Mr. Chairman. If the Fryingpan-Arkansas bill for 100,000 acre-feet were all that were before the committee, we would probably react to it as we have to each of the other upper basin bills during the past several years. We have not objected to any of them. All have gone through on the Consent Calendar, as a matter of fact—and this one did through the Senate—and it was not until the Colorado River storage project became active and we realized that we were confronted simultaneously by both that we became seriously concerned about the implications of the Fryingpan-Arkansas bill as involved here.

V. CONCLUSION

California's basic position is that our State is conforming to the Colorado River compact, the Boulder Canyon Project Act, and the other enactments which comprise the "law of the river," and we must insist that the Reclamation Bureau and the upper basin States do

likewise in the planning and administration of the Colorado River storage project.

The Colorado River storage project, as now planned, is based upon interpretations of the compact which, in our view, are wrong and constitute encroachments upon the compact for the benefit of the upper basin to the extent of more than 2 million acre-feet per year.

Essentially, the proposed Colorado River storage project implies the destruction of a substantial portion of the value of the Boulder Canyon project, in terms of water and power production, to enable construction of a new project in the upper basin which will generate power at twice the cost and irrigate lands at many times the cost of the power and irrigation furnished by Hoover Dam and in violation of the Colorado River compact.

We say that the water and power users of California, who have invested more than a half-billion dollars upon the faith of the Colorado River compact, the Boulder Canyon Project Act, and their agreements with the Federal Government, are entitled to the protection of their stake in the Colorado River, both in Congress and the Supreme Court.

Thank you, Mr. Chairman.

Senator ANDERSON. Senator Millikin, I had a great many questions, but I do not have the ability to phrase them in proper legal language, and I have asked Mr. Bennett to handle some of those for me. Do you mind?

Senator MILLIKIN. That is agreeable to me.

Senator ANDERSON. Mr. Ely, I will let Mr. Bennett ask some questions because when it comes to examination between lawyers you are completely out of my element.

Mr. ELY. That is perfectly all right, but from previous experience I would say that you don't need any help.

Mr. BENNETT. To begin with, I would like to say that I feel a little awed because Mr. Ely is a good friend of mine—at least, I have counted him so for many years and we have many common interests. Of course, I have some pretty strong ties in California myself. I went to law school there. So this is a rather interesting position to be in at the moment.

Mr. ELY. I reciprocate all that has been said and I have great respect for Mr. Bennett's judgment and ability, and we will remain good friends even though we meet here on the plains of Philippi.

Senator ANDERSON. We are honored to have you before the committee, Mr. Ely.

Mr. ELY. I may say I have received nothing but courtesy from this committee, notwithstanding that its members, I know, are committed the other way.

Mr. BENNETT. To begin with, to get a common ground here on the facts which the committee is dealing with, is it your understanding that the present uses of water in California are somewhere in the neighborhood of 6 million acre-feet?

Mr. ELY. No; I think that they are slightly over 5 million, Mr. Bennett.

Mr. BENNETT. Is it also your understanding that the uses of water in the upper basin at the present time are something in the neighborhood of 2 million acre-feet?

Mr. ELY. Between 2 and 2½, I understand.

Mr. BENNETT. Is it your understanding further that the authorized projects in the upper basin, such as the Collbran, which have not been constructed, might add three or four or five hundred thousand acre-feet to that total?

Mr. ELY. I think that is probably correct.

Mr. BENNETT. Then we are dealing with a bill which affects a water situation involving present uses of something over 6 million, if we count Arizona. I assume it would be in that neighborhood, in the lower basin?

Mr. ELY. Arizona's existing and authorized projects, as I understand it, will require all together about 1,200,000 acre-feet from the main stream. California's existing and authorized projects would require 5,362,000. The Nevada uses are as yet relatively minor, from the main stream. As to the upper basin uses, I will accept your statement as to what they are.

Mr. BENNETT. Then we have lower basin uses somewhere in the neighborhood of 6½ million acre-feet of water, counting Arizona and California?

Mr. ELY. From the main stream.

Mr. BENNETT. Yes.

Mr. ELY. And from the waters of the Colorado River system, including the Gila, measured as we measure those uses, something over 8 million; measured as Arizona measures them, something over 7 million.

Mr. BENNETT. I believe your statement uses the figure 4½ million acre-feet as being the potential uses in the upper basin if the projects named in this bill were authorized.

Mr. ELY. That is correct. It is an upper figure.

Another figure used here in testimony has been 4,300,000. And I have included in mine the 600,000 acre-feet of evaporation losses, which are, however, on the great reservoirs. So that if the participating projects were built without storage reservoirs, the aggregate would be somewhat less than the figure I have used.

Mr. BENNETT. Would it be a fair statement, Mr. Ely, to say that your opposition to this bill is predicated more on what you fear the Congress will do in the future rather than what the Congress actually does in this bill itself?

Mr. ELY. No; Mr. Bennett. Our concern is twofold, related to the two aspects of the bill. If the particpating projects were all that were involved, what you say would be correct; we would be disturbed by the interpretations of the compact implicit in the bill, and deeply concerned by the effect of transmountain diversions, but we would recognize that the total quantity is within the apportionment. And the danger might be a long time off, as you say.

But we are immediately concerned by the immediate effect upon us of the construction of the storage reservoirs. These confront us with a likelihood that immediately upon the completion of Glen Canyon Dam, when the gates are closed there, as one engineer has said, if Lake Mead is not full on that day it will never fill again, if the upper basin reservoirs are operated as the Reclamation Bureau apparently intends. And that is a calamity that happens to us not in the distant future but happens at once. Glen Canyon Dam will be the first great structure built, and the impact is immediate.

Mr. BENNETT. Then you do not feel that your legal rights are adequately protected by section 8 of this bill and section 12 of this bill?

Mr. ELY. No. May I have a copy of the bill?

Mr. BENNETT. Surely.

I would like to point out that section 8 of the bill reads as follows:

> Nothin contained in this Act shall be construed to alter, amend, repeal, construe, interpret, modify, or be in conflict with any provisions of the Boulder Canyon Project Act, the Boulder Canyon Project Adjustment Act, the Colorado River Compact, the Upper Colorado River Basin Compact, the Rio Grande Compact of 1938, or the Treaty with the United Mexican States.

Section 12, to use the exact language, in order to avoid any possible misinterpretations through paraphrasing, opens this way:

> In the operaton and maintenance of all facilities, authorized by Federal law and under the jurisdiction and supervision of the Secretary of the Interior, in the basin of the Colorado River, the Secretary of the Interior is directed to comply with the applicable provisions of the Colorado River compact, the Boulder Canyon Project Act, the Boulder Canyon Project Adjusment Act, and the Treaty with the United Mexican States, in the storage and release of water from reservoirs in the Colorado River Basin.

Would you care to comment on why those provisions are inadequate, in your judgment, Mr. Ely?

Mr. ELY. Yes, sir. Section 8 contains a very estimable disclaimer of intent to construe any of these documents, but, as is true of so much of this bill, Mr. Chairman, the operation of the project therein proposed has to be discovered from reading the underlying Reclamation Bureau reports. And from those, it is perfectly plain that they do construe the Colorado River compact, and in a way that is intolerable to us, in the two respects that I outlined early in my statement; first, with respect to the measurement of beneficial consumptive use; second, with respect to the averaging of the apportionment of seven and a half million, instead of treating it as a maximum entitlement in any one year; the combined effect of the two being to enable the Bureau under that interpretation—and it would be in control of Glen Canyon Dam as well as the other dams—to withhold from us the water that we think the lower basin is entitled to and upon which all the lower basin projects have been designed, and, for that matter, upon which the calculation of the system's ability to sustain the Mexican Water Treaty was based.

Now, the fact that the statute might disclaim any attempt to interpret does us no good if the Secretary of the Interior, with the control of these dams in his hand, is in fact interpreting the law of the river, and he is placing Congress on notice, in this report printed as a Senate document, that that is how he intends to operate.

Furthermore, it would appear, from what the engineers tell me, that the financial operations of Glen Canyon are based on the assumption of the availability to the upper basin power dams of water based upon that calculation.

So I would have to answer with respect to section 8, that it is totally ineffective. We would have to see the ground rules spelled out, and to spell them out would mean virtually reversing many assumptions of the Bureau in the underlying report.

With respect to section 12, the direction to the Secretary that he shall conform to all the law of the river is, of course, estimable. He should. But, again, when we differ by 2 million acre-feet as to what

these documents mean with respect to the obligation at Lee Ferry, it doesn't mean very much. He is already placing Congress on notice how he interprets these documents. We do not agree with the interpretation. I suppose if he had this mandate before him, he would go ahead and do just as he has told he is going to do in the underlying report, and we could not tolerate it.

I know we come next, Mr. Bennett, to the authorization for suit against the Secretary in section 12 if he does not comply, but we run into precisely the same trouble all over again. The danger to us—Do you want to take this up and state your own questions in your own way?

Mr. BENNETT. No. That is all right. Go ahead.

Mr. ELY. The language of section 12 in that respect is that:

> In the event of the failure of the Secretary of the Interior to so comply, any State of the Colorado River Basin may maintain an action in the Supreme Court of the United States to enforce the provisions of this section, and consent is given to the joinder of the United States as a party in such suit or suits.

That goes part way, and I do not mean to discredit the effort to write workable language here, because the intention is good. But the damage to us occurs in two ways; one, that the consumptive use projects when, as, and if built, upstream, are not covered by this mandate at all. They can go ahead and expand to the point where they are using, by our calculation, 9 million acre-feet or more per year, because, by the interpretation of the Secretary, that shall be averaged with years of lesser use and equal only seven and a half.

Also, since there are no ground rules whatever laid down as to storage reservoirs or participating projects, we are not eager to buy a second lawsuit. One is enough. We would much prefer to have the ground rules spelled out than to simply have a license to sue the Secretary at some future time.

Mr. BENNETT. Then the underlying documents constitute a good part of your fears here.

Mr. ELY. That is correct.

Mr. BENNETT. And you feel that Congress in S. 500 has not declared its intention to have the project operated otherwise.

Mr. ELY. That is correct, Mr. Bennett.

Mr. BENNETT. I don't believe that is the committee's intention, and we will proceed. At least, I know it was not the Department's intention.

Mr. ELY. Thank you.

Mr. BENNETT. Secondly, in your statement I believe you used the figure that the project plans contemplate the use on occasion of as much as 9 million acre-feet of water in any given year, in some years at least, in the upper basin. My information is that the project plans do not contemplate any such use, and I wonder if you or any of the engineers with you are in any position to point out where the project plans provide for the use of any more than 7½ million acre-feet of water in any given year.

Mr. ELY. Not being an engineer, I will give you an engineering opinion very freely, as we lawyers do.

At page 152 of House Document No. 364, which is captioned "Colorado River storage project," appears a table captioned "Determination of active storage requirement to permit full utilization of apportioned consumptive use." And that is in six columns; the first being a

tabulation by years from 1914 to 1947; the next being captioned "Virgin flow of Colorado River at Lee Ferry"; the next, "Ultimate use of upper basin apportionment." That is the column to which I shall turn back in a moment. The next is "Ultimate depleted unregulated flow at Lee Ferry." The next is "10-year moving total flow at Lee Ferry." And the final column is "10-year variation from 75 million acre-feet."

In the column captioned "Ultimate use of upper basin apportionment." for the years 1914–47, it shows, for example, for 1914, 9,030,000 acre-feet. For 1915, it shows 6,910,000 acre-feet; for 1916, 8,860,000 acre-feet; for 1917, 9,530,000 acre-feet; for 1918, 7,920,000 acre-feet; for 1919, 6,560,000 acre-feet; for 1920, 9,370,000 acre-feet; for 1921, 9,470,000 acre-feet; and so on; with the other years shown as materially less, ranging down to 6 million, 5 million, and 4 million.

The right to calculate the apportionment on an average basis rather than an annual basis was asserted by the negotiators of the upper Colorado River Basin compact, without translating their assertion into figures, in the hearings of the House Committee on Public Lands on H. R. 2325, 81st Congress, 1st session, at page 57. That was in answer to a questionnaire of the committee directed to the negotiators as to how they interpreted their compact, in answer to question No. 3.

As I have stated, the result of this contention in figures appears in the document to which I have just referred. This shows uses by proposed upper basin projects of more than 7½ million acre-feet in each of the 17 years corresponding to the historical years 1914, 1916, 1917, 1918, 1920, 1921, 1922, 1923, 1926, 1927, 1928, 1929, 1930, 1932, 1938, 1941, and 1942, ranging from an excess of 90,000 acre-feet in a year like 1930 to an excess of 2,030,000 in a year like 1917.

The aggregate use in these 17 years in excess of 7,500,000 acre-feet per annum is 15,680,000 acre-feet, and the average excess for each of the 17 years is 920,000 acre-feet. The average excess for the whole 32-year period is 490,000 acre-feet per annum.

I have been reading from a portion of the brief of the California defendants in support of their motion to join these four States as parties in the present suit.

Mr. BENNETT. Well, is it your contention, then, that there are possible participating projects for consumptive uses in the upper basin that are reflected in this table and which might someday be authorized and constructed?

Mr. ELY. Yes; section 2 declares the intention to put all of the upper basin water to use, and this table shows the Bureau's calculation of how much water is available to put to use.

Mr. BENNETT. However, the project plan for the Colorado River storage project and participating projects has never made recommendations to construct projects to use anywhere near the maximum figures that are reflected here; is that not so, Mr. Ely?

Mr. ELY. S. 500, you mean?

Mr. BENNETT. No, not S. 500. I am thinking in terms of the project plan which was prepared in 1950 or thereabouts. Is this chart not a study of water availability, rather than a reflection of project recommendations made by the Department.

Mr. ELY. These recommendations for projects come forth from time to time. They are inventoried in House Document No. 419, about a hundred projects, which all together, if they were all built, would

come to more than this. Some, such as the Fryingpan Arkansas, are in other bills.

Mr. BENNETT. That is what I wanted to find out.

Mr. ELY. As Mr. Morris referred to this morning, section 2 authorizes unborn projects. We don't know what they are. But they are authorized, and it is declared to be the intention that they will be built in that general way, with this underlying document confronting us, with an assertion of claim to water amounting to over 9 million acre-feet a year.

Mr. BENNETT. I want to get back again to the fact, though, that this was a water availability study rather than being a reflection of any table of uses which the Bureau of Reclamation or anyone else has ever approved.

Mr. ELY. I will take your word for that, Mr. Bennett.

Mr. BENNETT. Well, I mean, the heading is "Determination of Active Storage Requirement to Permit Full Utilization of Apportioned Consumptive Use."

Mr. ELY. The column from which I have read is captioned "Ultimate Use of Upper Basin Apportionment."

Senator ANDERSON. May I ask just a question on that? Actually, that was the exact amount that would be available to the upper basin States if the compact were absolutely strictly applied, is it not?

Mr. ELY. We think that that would be far in excess of the amount lawfully available to you.

Senator ANDERSON. The flow in that year was somewhat in excess of 21 million acre-feet. In reaching this calculation they gave the upper basin States 7½ million acre-feet, the lower basin States 8½ million acre-feet, and they made an allocation for the Mexican Treaty water, and they made an allocation of the million acre-feet, and they divided the surplus that was left. Does not the compact provide for that?

Mr. ELY. Let me take that point by point. The 21 million to which you refer includes the water available on the Gila River and other tributaries.

Senator ANDERSON. I am sorry. It does not. It is virgin flow at Lee Ferry.

Mr. ELY. Are you referring to this table? I am referring to the reports of the negotiators. We are speaking at cross purposes.

Senator ANDERSON. No. You brought this table up.

Mr. ELY. I thought your 21 million was referring to the one used earlier in these hearings as being the report of the negotiators. I am sorry, sir. We are speaking at cross purposes. Would you identify to me what you are speaking of?

Senator ANDERSON. I am talking about the very first column, or rather the second column, 21,220,000 acre-feet. Now, they arrived at this figure by saying if they gave the lower basin 8½ million acre-feet and the upper basin 7½ million acre-feet, and they took the Mexican water and divided it, and so forth, and gave you everything you could possibly imagine under the compact, there was some surplus water remaining, and they divided that between the two basins. What is wrong with that?

Mr. ELY. I would have to say that is not what they did, Senator Anderson.

Senator ANDERSON. How did they get the figure of 21,220,000, then?

Mr. ELY. How did the Bureau of Reclamation? These are Bureau figures. I don't know how.

Senator ANDERSON. Then why do you say it was not the way I said it was.

Mr. ELY. I would be glad to show you how the compact negotiators arrived at the figures, if you would like to have it.

Senator ANDERSON. I am not interested in them. They did not prepare these figures.

Mr. ELY. I thought you were saying: Is this not what the compact did?

Senator ANDERSON. No. we started with 21 million acre-feet, and we take away from it 16 million acre-feet——

Mr. ELY. No. We have to break apart right there. Because the 16 million acre-feet—I take it you are including the III (a) and III (b) water in that?

Senator ANDERSON. The maximum that you could possibly ask for.

Mr. ELY. That must include under the compact uses on the Gila. So right at that point, we come apart.

Senator ANDERSON. Well, if you do, that gives me a half million extra feet advantage which I was trying not to take.

Mr. ELY. Yes, quite so. You have some more surplus in the whole system.

Senator ANDERSON. I agree with that. I was trying to be extremely cautious about it. Take off 15 million acre-feet from 21 million acre-feet, and you have some 6 million acre-feet left.

Mr. ELY. Again, sir, we break at that point each time, because the Colorado River compact divided the waters of the system, not of the main stream. And you must include the waters of the Gila River. This table deals with only the virgin flow of the Colorado River at Lee Ferry, which is one of the assets of the Colorado River system. Other assets are the Gila River, the Virgin River, and other lower basin tributaries, which, under the compact, must be taken into account.

Senator ANDERSON. What is your objection to the 9 million acre-feet?

Mr. ELY. Because the caption is "Ultimate Use of Upper Basin Apportionment." We say the ultimate use of upper basin apportionment to which you are entitled in any 1 year is not to exceed 7½ million acre-feet, not 9,030,000 acre-feet.

Senator ANDERSON. Plus anything? Plus some surplus water if it was there?

Mr. ELY. For our part, we concede the right of the upper Basin States to appropriate surplus. Arizona does not.

Senator ANDERSON. We have your more liberal contention, then, and start with that.

Mr. BENNETT. There are several of them.

Mr. ELY. But I must put a caveat right there.

Senator ANDERSON. We will take care of ourselves against Arizona if we can just get by with California.

Mr. ELY. You are not in too good shape as against us, sir, because we say that all of the excess and surplus has either been dedicated to Mexico or appropriated in the lower basin; so that our concession of your right to appropriate surplus must not be taken as too wide a concession.

Senator ANDERSON. You say that all the surplus is either taken for the Mexican Treaty or is appropriated to the lower basin States?

Mr. ELY. That might not be true in every year.

Senator ANDERSON. Then what is the provision of paragraph (f) under III, that says, at some later date, 1963, they shall get together and divide up this surplus? If it is already gone, why divide it?

Mr. ELY. The problem there is one that I mentioned in my prepared statement and is at issue in the Supreme Court. Does or does not the compact withhold from appropriation in the upper basin and the lower the unapportioned surplus, in the sense that no one can acquire rights in it, and that they all must depend upon unanimous consent at some future day after 1963. We say no, that the unapportioned surplus may be appropriated by any State, surely by California, under the terms of the limitation act, up to one-half of the excess or surplus and no more.

Senator ANDERSON. I am not trying to take your half away from you. I am just trying to get our half.

Mr. ELY. We think you gave your half to Mexico.

Senator ANDERSON. Well, that is extremely broadminded of you.

Mr. ELY. We urged you not to do it.

Senator ANDERSON. I think it is unfortunate. I only wanted to say that it seems to me perfectly natural that they might set up this 9 million acre-feet, because every test I see in the compact was met. There is more than enough water to deliver the appropriate amount of acre-feet, more than enough water to take care of the Mexican Treaty, more than enough water to take care of everything California is entitled to, under the plain language here.

Mr. ELY. Speaking in a general way, you are quite correct, yes.

Senator ANDERSON. And we thought we had a chance at some of that extra water.

Mr. ELY. I am willing to give you the chance. But we say it is not apportioned water. It is excess or surplus.

Senator ANDERSON. I do not say it is apportioned. I say when it becomes surplus, we have a right to divide it with you.

Mr. ELY. We go further. We say you have a right to go ahead and use it if your appropriation of it is senior to ours. You do not have to wait for us to agree that you can use it after 1963. You can appropriate it right now. We say we have appropriated it. If you have senior appropriations to ours, they would be sustained, I suppose, in the present lawsuit. That is one of the issues in the suit.

Arizona denies to all of us the right to make any present appropriations of surplus. She says you cannot acquire any right to it at all until after 1963, and then only by unanimous consent. That is, with Arizona's consent.

Senator ANDERSON. That is what I was trying to get to. Because that is the point that you made in your paper, that there cannot be any surplus water; there is no point in meeting in 1963; if there was any, you have already gobbled it up. And we do not agree with that. We think we have a crack at it yet.

Mr. ELY. We are willing that you should have a crack at it, Senator, but Arizona does not agree that you should have a crack at it.

Mr. BENNETT. Now that we have dealt with the future possible development in the upper basin, I would like to come back again to the provisions of S. 500, which the committee has before it.

Senator ALLOTT. Mr. Chairman and Mr. Bennett, may I ask a question? I want to get out here the plain effect of what you have just said.

In other words, it is your position and your contention that as long as California can withhold any development in the upper Colorado, by way of dams or reservoirs, the water which flows down the river would be California's as long as she keeps devoting it to a consumptive use, and we can acquire no rights under it.

Mr. ELY. Not at all, Senator.

Senator ALLOTT. That is the substance of what you have said.

Senator ANDERSON. That is the only conclusion you can draw from what you have said.

Mr. ELY. Let us come right to grips on that. That is not what I have said, sir. We recognize your apportionment in perpetuity, insulated, which is the expression I have used, against the law of priority of appropriation. You have the right to the beneficial consumptive use of up to 7,500,000 feet in any 1 year. You may take that starting 100 years in the future or take that starting 1 year in the future. The fact that we have in the meantime built up uses which would have to be cut back to enable you to do so is immaterial. That is the intent of the compact, to insulate the upper basin against the law of priority of appropriation in the lower, to the extent, but to the extent only, of the consumptive use of 7,500,000 acre-feet in any 1 year.

The objection we have is that this 7,500,000 foot protection is expanded and ballooned by the Bureau of Reclamation's interpretatiton, which treats it not as a limit in any 1 year but as an average over a 35-year period, with the effect that if they are correct, you could take away from us, from established appropriations in the lower basin, not up to 7,500,000 but up to whatever the figure might be, 9,400,000, nearly 2 million acre-feet more, in any particular year, because in some other year you had used less than 7,500,000.

Senator ALLOTT. That, I think, sir, if I may say so, is begging the question, because under Senator Anderson's question, if I understood your answer to it—I would like to bring you back to that. Is it your feeling that as long as there are no upper Colorado River projects constructed, California can keep on using this water, and by doing so acquire vested rights—and I suppose that you use those terms in the same sense that I do—in the water thereto?

Mr. ELY. No, not under the intent of article III (a). Just the reverse. At any time in perpetuity, whenever you get around to it, you may put that to use, regardless of the quantity in the lower basin that is put to use.

Senator ALLOTT. With that plus your Mexican Treaty water plus your million acre-feet, it is your contention that above that you have acquired vested rights by appropriation and conversion to beneficial consumptive use of the additional waters, and that therefore, the water which Senator Anderson spoke of could not be divided with the upper basin, in such a hypothetical situation?

Mr. ELY. Are you speaking of excess, or surplus?

Senator ALLOTT. Surplus above that.

Mr. ELY. Excess or surplus above the apportioned water?

Senator ALLOTT. That is right.

Mr. ELY. We will put to one side for the moment the relation of the III (b) water, and we will speak of apportioned water on the one hand and the excess or surplus water on the other hand. I say that your right reserved by the compact in perpetuity is to use up to seven and a half million acre-feet, irrespective of the law of appropriation; that if you seek to go beyond that, your are appropriating waters in competition with us.

If you seek to use more than seven and a half million acre-feet in any 1 year, you must acquire the right thereto by appropriation or by further interstate compact or court decree; you are not getting it under article III of the compact as this report attempts to give it to you.

Senator ALLOTT. Are you referring to a year such as Senator Anderson described, when there would be as much as 21 million, using that as the criterion?

Mr. ELY. If there were in a year such an amount as 21 million, there would be water available in that year for appropriation in both the upper basin and the lower. It is a tremendous year. But they cannot build projects upon the availability of water at long intervals like that.

Senator ALLOTT. Yes; but while we would not build a project, neither you nor myself or anyone else, I presume, under such an assumption, the point I am trying to get at is: In such an instance and in such a year, what is your position with respect to this surplus water? Have you then, in that instance, in your mind, acquired such vested rights that none of that water would be available to the upper basin?

Mr. ELY. It would depend entirely, Senator, upon the stated appropriations at that time. So far as we are concerned, our claim is to 5,365,000 acre-feet per year and no more.

Senator ALLOTT. Are you making a difference between appropriations and diversions in your own mind?

Mr. ELY. No. We are entitled to the beneficial consumptive use, diversions less returns to the river, of 5,365,000 acre-feet per year, and no more. In a year such as you are describing, we do not claim and do not have the facilities to use water beyond that. We were required by the Limitation Act to cut ourselves back to 4,400,000 acre-feet of the waters apportioned by article III (a) plus one-half of the excess or surplus. We have built our works to use approximately 1 million acre-feet per year of that excess or surplus, on the expectation that the excess or surplus to which that fraction is applicable would average more than 2 million acre-feet in most years.

Consequently, the case you are posing is entirely hypothetical, as far as we are concerned. We do not have the works to use it. We scrapped and had to scuttle fine projects, such as the Chuckawalla Valley, for which Congress had authorized diversion of water as early as 1910. We abandoned it, because there was not enough water for it under the Limitation Act. The only projects saved by California in consequence of the Limitation Act are the three great diversions, the one of the metropolitan water district at Parker through the Colorado River Aqueduct, the Palo Verde diversion, and the All-American Canal and the total of their water contracts is 5,362,000 acre-feet per year.

Senator ALLOTT. I think by your answer you have convinced me of what your position is, and that is sufficient.

May I ask one more question, Senator Anderson?

Senator ANDERSON. Surely.

Senator ALLOTT. On page 22 of your statement, under article 7, you say:

> California alleges, in the pending litigation, that any State, including the upper basin States, may appropriate surplus waters unapportioned by the compact, subject only to their being divested by a new compact to which such a State is party, or by court decree. Arizona and Nevada say that no State may acquire any right. * * *

Now, did you, in your own mind, have a difference in the use of the words "may appropriate surplus waters," as you used them for California, and "acquire any right" as you used them with relation to Arizona and Nevada?

Mr. ELY. No, not intentionally. We use the word "appropriate" in this discussion as a shorthand way of describing either appropriations under State law or rights acquired or confirmed by contract with the United States to waters stored by the United States.

Senator ALLOTT. That is what I wanted to get at. You meant the same thing in these two instances.

Mr. ELY. Yes, if I understand your question correctly.

Senator ALLOTT. I am asking you in a sense for your evaluation of those terms.

Mr. ELY. Yes, that is correct. We say that California, Arizona, Nevada, the four upper basin States, can appropriate surplus. We say that our appropriations are old and good up to the extent of the Limitation Act, one-half of excess or surplus.

If you would like to have for the record some of the contemporary reports on that, I would be glad to supply them.

Senator ALLOTT. No; the reason I was questioning you was because I wanted to know if there was any reason why you changed your terminology in the two instances.

Mr. ELY. No. The bill, so far as I understand it, does not contain the provision in the Project Act that the right to the use of stored water can be acquired only by contract with the United States; I suppose because with the exception of the Navaho Dam, there are no storage dams above the point of diversion. I suppose it is planned to acquire rights for participating projects directly by appropriation under State laws rather than by contract with the United States.

In our case, as I say, we have the complication that no one can use the stored water except by contract with the Government.

Senator ANDERSON. If I may follow up the questioning for just a second: The phrase I was looking for when you were reading this was on page 22, which is similar to what he was discussing. You say:

> Actually, under the compact, the Boulder Canyon Project Act and the Mexican Water Treaty, all excess and surplus water of the Colorado River system, has already been appropriated or obligated to uses in the lower basin and Mexico.

Now, what you are actually saying is that if we had a wet cycle, and the Colorado River water at Lee Ferry measured 25 million acre-feet a year, for 10 straight years, giving 250 million acre-feet, and we are only obligated to deliver 75 million acre-feet, it is your contention that all of that excess and surplus water has already been appropriated to obligation and uses in the lower basin and Mexico?

Mr. ELY. No; in the light of your analysis, my statement is too broad; California is limited to half the excess of surplus, and our total right is 5,362,000 acre-feet.

Senator ANDERSON. Well, I go back to what I tried to get you to a moment ago.

Mr. ELY. What I mean to say is that as a practical matter, you cannot put the excess to use except by storage.

Senator ANDERSON. That is why we try to build the storage dams. We know that.

Mr. ELY. If all of the waters of the river were salvaged and used, the representation of the Bureau of Reclamation during the Mexican Water Treaty was that the yield available for the lower basin plus Mexico is approximately 9 million acre-feet per year. That is accomplished by a drawdown of Lake Mead of a million and a half acre-feet per year for 10 years, which presupposes that in some other 10 years you are going to get it back from some other place, the upper basin. Consequently, there must be an average of something on the order of 9 million acre-feet coming down. Otherwise your books won't balance for the Mexican Water Treaty.

I have started with the assumption, that you arrive at the 9 million by assuming enough storage on the river to put these great flood years to use. If we did not have it and had "wild water" in some year, then my statement here is not accurate.

Mr. BENNETT. Your statement about the potential uses of 9 million acre-feet of water as having been accepted with approval by the Bureau of Reclamation also carried with it an assumption of fully developed storage in the upper basin, did it not?

Mr. ELY. I assume that they are talking about a fully developed river; yes sir.

Mr. BENNETT. Well, this bill does not authorize the construction of the storage necessary to accomplish that purpose even as described in the reports of the Bureau of Reclamation, does it?

Mr. ELY. There you get into an engineering field, where I hate to step into the flypaper. There is available, as you know, a report by Raymond Hill to the State of Colorado, as to the amount of storage required to fully control the river down to economic limits. My recollection is that the maximum figure that he comes up with is of the order of 23 million acre-feet of storage. That much storage would be provided by Glen alone. As a matter of fact, again going outside my field, I have heard some engineers say that but for the fact that the compact takes Lee Ferry as the point of division, you could perform the 75 million "nondepletion" guaranty and meet the requirements of the Mexican Water Treaty by reckoning the deliveries below Hoover Dam instead of at Lee Ferry; that is, that Hoover alone will accomplish substantially all the regulation required. That may or may not be a sound engineering statement. But the justification for 48 million acre-feet of storage is seriously challenged by any number of engineers, as contemplating a 35-year carryover.

Whether the Bureau assumes, on this table to which you and I have been referring, on page 152 of House Document 364, storage of 44 or 48 million, or 23 million feet, I cannot say.

Mr. BENNETT. As I recall it, the Colorado River storage project contemplated either 9 or 10 storage reservoirs, did it not, for full development of the upper basin apportionment?

Mr. ELY. I think you are correct.

Excuse me. The 48 million acre-feet? There you run into the question of how much was required for full development. I do not know.

Mr. BENNETT. At any rate, this bill does not authorize that amount of storage, does it?

Mr. ELY. Six reservoirs with an aggregate capacity of 44 million, I believe.

Mr. BENNETT. Now, of course, part of the capacity of those reservoirs, if I remember correctly, such as Navaho and Curecanti, is scheduled for actual agricultural and perhaps domestic use; is that not correct?

Mr. ELY. I take your word for that.

Mr. BENNETT. Now, I noticed that the statement is made that these bills all authorize the future construction of other projects. I am a little troubled about that, in two ways. Do you feel that the language of section 2 authorizes the Secretary of the Interior to build any projects which are not specifically referred to in section 1 of this bill?

Mr. ELY. I cannot give you a clear answer on that, because to me, the language is not clear.

Mr. BENNETT. Would you say that you would feel the language was clear if the words "in the future" followed the words "to authorize" instead of preceding them?

Mr. ELY. The matter of language does not concern me particularly. I think that a decision should be made either that they are authorized if the Secretary finds these projects feasible, since the Millikin-O'Mahoney amendment is waived with respect to the necessity for concurrence by the affected States, or prohibit that and tell him to come back and bring in his reports, and Congress will authorize them as they feel like it.

Mr. BENNETT. At any rate, the language on which your interpretation is based is this:

> It is the intent of the Congress in the future to authorize * * *.

and so forth. Of course, I know that the Department has not construed that language as authorizing the Secretary to do anything until Congress tells them to.

Secondly, could you tell me what language in this bill waives the requirements of the Millikin-O'Mahoney amendment as to any of these unnamed projects that you refer to?

Mr. ELY. That is in the bill which Congressman Rogers introduced, and which Governor Johnson had here the other day.

It was in the legislation last year also. As I have said, I do not know which of these various bills you are going to act on.

Senator ANDERSON. We are holding hearings on S. 500.

Mr. ELY. Which will finally emerge, I don't know; whether Governor Johnson's recommendations for amendments are going to be approved or not. I don't know. If they are, that is one that is involved.

Senator ANDERSON. Frankly, I was not conscious that we were approving any propects other than those named in the bill.

Mr. BENNETT. I would like to ask, Mr. Ely, whether you know of any of the named projects in section 1 of this bill, other than the

Gooseberry, San Juan-Chama, and Navaho, where feasibility reports have not already been reviewed by the States of the basin?

Mr. ELY. That I could not tell you.

Mr. BENNETT. You are also familiar with the proviso in section 1 of the bill which requires that the San Juan-Chama and the Navaho projects be submitted in the form of coordinated reports to the States of the Colorado River Basin, and also Texas?

Mr. ELY. Yes, sir. Pardon me. You asked where in this bill there was a waiver of the O'Mahoney-Millikin amendment. Right in section 1 of this bill there is express direction to the Secretary to make supplemental reports on the named participating projects which, as to some of these, are bound to be rather extensive. These projects must need them badly or the Secretary would not be told to make supplemental feasibility findings; and as to those supplemental reports, the language is quite explicit on page 4, line 7:

> Section 1 (c) of the Flood Control Act of 1944 shall, except as hereinafter provided for the San Juan-Chama and the Navaho participating projects, not be applicable to such supplemental reports.

I do not know why not.

Senator ANDERSON. Those are named projects in the bill on which there exist good reports. The Navaho and San Juan-Chama products do not have feasibility reports.

Mr. ELY. I suppose they all are not good enough or they would not be sent back to the Secretary.

Senator ANDERSON. I can recall the Eklutna project in Alaska, with which Senator Millikin and I wrestled for a long time, and I took a look at it a while back and there were many supplemental reports necessary on it, and when we got into the mountain we found rock of a wholly different substance than we thought to be there.

I think that is all that is intended here, that there be options to do that. In other words, I do not believe this is language designed to permit a whole series of new projects to be pulled in under the tent, and if it helps any to clear that up by some sort of statement that would effect legislative intent, I would have no objection to doing it.

Mr. ELY. I am getting now somewhat outside of my field trying to answer that question, but on page 3, line 15, is the direction that—

> construction of the participating projects set forth in this clause shall not be undertaken until the Secretary has reexamined the economic justification of such projects—

and so on, and render such supplemental report.

Senator ANDERSON. Are not all those referring to the named projects?

Mr. ELY. Yes; but I do not know why the O'Mahoney-Millikin amendment to the 1944 Flood Control Act should not apply to such supplemental reports, since they deal with economic justification.

Mr. BENNETT. At one point—I believe it was on page 4 of your statement, Mr. Ely, at the bottom of the page—you make the statement that the bills all make clear that this measure is intended to commit Congress to a program for the full utilization of all the water which the upper basin claims under the Colorado River compact.

At that point I would like to call your attention to clause 1 of section 2 of the bill which, after the declaration of intent of the Congress as to its future action, says that it contemplates the use of waters of

the upper Colorado River system, the consumptive use of which is apportioned to those States by article III of the compact.

That being the case, is it a fair statement that Congress is here declaring its policy to build whatever projects might be necessary to use up whatever the upper basin States may claim as their interpretation of the compact?

Mr. ELY. Yes; I would think that mine is a fair statement.

Section 2, page 5, line 4, says:

> In order to achieve such comprehensive development as will assure the consumptive use in the States of the upper Colorado River Basin of waters of the Colorado River system, the use of which is apportioned to the upper Colorado River Basin by the Colorado River compact, and to each State thereof by the upper Colorado River Basin compact, it is the intent of the Congress in the future to authorize the construction, operation, and maintenance of further units of the Colorado River storage project, of additional phases of participating projects authorized in this act, and of new participating projects, as additional information becomes available and additional needs are indicated.

House Document 364 at the table on page 152, to which we referred, gives, I suppose, the Bureau's interpretation of what that "use which is apportioned" is. The column entitled "Ultimate Use of Upper Basin Apportionment," tabulates that "apportionment" on the average method and shows uses in excess of 9 million acre-feet of the so-called apportionment. That is to be read in the light of a specific claim of the right to do so by the upper basin compact negotiators, made in answer to the House committee, in hearings on H. R. 2325 of the 81st Congress, to which I referred.

Mr. BENNETT. Your quotation from S. 500 is the first sentence of section 2 and, as I pointed out before, the second sentence of section 2 explicitly refers to the uses of water apportioned by article III of the compact.

Could you be any more explicit, Mr. Ely, in telling us how the named projects authorized in section 1 of this bill would impair the water supply for the contracts in California?

Mr. ELY. Yes, sir.

Mr. BENNETT. In the light of our beginning understanding that the consumptive uses or the depletions involved in these named projects would not amount to more than 1,800,000 acre-feet of water, added to the existing 2,500,000.

Mr. ELY. I would be glad to try to.

Let us put aside for the moment the effect of the participating projects; I shall refer now only to the effect of the construction of these storage projects, which is an immediate effect.

These storage projects will intercept some 3 years' flow of the river. The water they are storing is not, as has been said erroneously here from time to time, "upper basin water." The compact apportions to the upper basin, as it apportions to the lower basin, only the right to the beneficial consumptive use of the water, not the right to the flow of the stream. It is an apportionment of the right to use.

When it is stored at Glen Canyon or elsewhere, that is water that can only be used in the lower basin and in Mexico. It is not the property of the upper basin.

Commencing when the Glen Canyon Dam is closed, at once, and thereafter for a protracted period of filling, ranging in last year's testimony from 20 to 25 years—I do not know where the Bureau

got the figure this year of 5 years to fill those dams—as of last year it was 20 to 25 years, and we think the larger figure is correct—you are impounding water there and releasing to us only such water as the Secretary of the Interior thinks he is obligated to release under the compact.

If he believes the Bureau's interpretation he is going to release 75 million acre-feet every 10 years, and no more.

If he believes that the upper basin is correct, that the 75 million is subject further to a prior right to their apportionment of 7,500,000 then, when the time comes that projects are built up to use all that, is going to release less than 75 million in each 10 years.

Starting in 1960, or whenever Glen Canyon is finished, our water supply will be cut that year and for the 10 years to follow by 25 to 35 percent, and at once our power production, as Mr. Tillman has demonstrated here, is cut back. So also with the Davis and Parker Dam power.

As Mr. Matthews indicated, the total loss in power in the lower basin during this 20- to 25-year period approaches $200 million, which has not been taken into account in evaluating the upper basin project. But the loss of power is not so important in the long run as the loss of water. If you do that to us lawfully in the filling period, you can do it lawfully at any time in the future, and we no longer have permanent water rights, which were good on the interpretation of the compact which we had assumed. We can expect only the 75 million every 10 years, which is a reduction of 25 percent of the quantity of water upon which both the Interior Department and ourselves relied. The Mexican water was based on a much larger expectation than 75 million, something over 90 million.

Mr. BENNETT. Is it true, Mr. Ely, that your answer to the last question presupposes that the upper basin States have no right to store water, even temporarily, for the generation of power under the compact?

Mr. ELY. We say that the upper basin States and the United States have no right to retain in Glen Canyon or other reservoirs for power generation water which is required for beneficial consumptive use in the lower basin, even though it is excess or surplus water. That statement is derived from our rights under the Colorado River compact and the Boulder Canyon Project Act.

We say second that neither the United States nor the upper basin States have a right to impound and withhold from us water for power generation which is required for power generation at Hoover Dam or elsewhere under contract with the United States in the lower basin.

The right is derived not from the compact, but from the Boulder Canyon Project Act terms of the contract.

Mr. BENNETT. It is derived from the terms of the contract, but certainly you would not say that the Secretary could contract to do anything he was not authorized to do by the Boulder Canyon Project Act, would you?

Mr. ELY. No. He was clearly authorized by the Project Act to make these contracts with respect to the sale of firm and secondary energy. The Project Act required that he obtain in that manner the revenues required to amortize the cost of the Hoover Dam. He is not authorized by any statute—and I do not think he constitutionally

could be—to interfere with his own performance of those contracts by intercepting that water to use it for power generation upstream. He can intercept it for consumptive use, in the upper basin, but not for power generation, as such.

Mr. BENNETT. Is it your contention, then, Mr. Ely, that the generation of power in the lower basin has a priority or preference somehow, under the compact, over power generation in the upper basin, assuming that the rights to the use of the water were on a par otherwise?

Mr. ELY. I cannot answer it in quite that way. We say that the rights established under the Boulder Canyon Project Act, and power contracts made thereunder cannot be lawfully interfered with by the withholding of water at Glen Canyon or other upstream dams, solely for power generation.

Mr. BENNETT. Would you say that that would depend on the interpretation of article IV (b) of the compact?

Mr. ELY. No.

Mr. BENNETT. Even in view of the limitations in the Boulder Canyon Project Act with respect to the applicability of the compact?

Mr. ELY. Let me look at article IV again before I answer it.

No. I take it your question relates to competing claims solely for power generation at Hoover Dam, and, let us say, Glen Canyon?

Mr. BENNETT. Yes.

Mr. ELY. The compact is perfectly blank on that point. The compact would require the water at Glen Canyon be released for beneficial consumptive use in the lower basin in competition with the claim of right to withhold for power generation at Glen, but the right of the Hoover Dam power contractors to have the power delivered to them at Hoover and not interfered with by retention of the water at Glen Canyon for power generation derives from the terms of the Project Act and their contracts, I would say, and not from the terms of the Colorado River compact.

Mr. BENNETT. That again, of course, depends on whether or not the section of the Boulder Canyon Project Act incorporating the terms of the compact is so construed; is that correct?

Mr. ELY. Yes; but there is nothing in the compact which gives to the Secretary or to the upper-basin States, in our view, the right to withhold water for power generation, as against the right for power generation established by Government contract in the lower basin. We deny the right of the Secretary to withhold that water from power generation at Hoover for power generation at Glen, based upon any right that he may claim derived from the Colorado River compact.

Mr. BENNETT. Then also do I understand that you deny the right of the upper-basin States to build storage reservoirs for holdover purposes, in order to make possible the use of the apportionments made to them, whatever those apportionments may be under your definition or anyone else's definition?

Mr. ELY. No; we do not. We don't reach that problem in this bill, if we assume correctly that the total consumptive use of the section 1 projects may be accomplished without any holdover storage whatever.

Mr. BENNETT. In your statement you made considerable reference to the varying theories of measurement of the uses of water under the compact.

That is a very serious problem as between California and Arizona. I think everyone on the committee recognizes that. However, I would like again to emphasize that, even according to your own engineers' estimates, the maximum amount of difference that that would make in use of the upper-basin apportionment is no more than 300,000 to 500,000 acre-feet of water per annum. Is that correct?

Mr. ELY. I think that is substantially correct. I have heard larger figures, but I think that range is fair enough.

Mr. BENNETT. Is it not true that the principal impact of that varying interpretation is wrapped up in the issue of the Gila water uses in Arizona?

Mr. ELY. That is where the big dispute is. The dispute on that river, however, affects the upper basin. I will not attempt to spell it out here, but the question of how much of the 75 million III (d) water is surplus is affected by the question of whether the III (a) uses on the Gila are measured at 1 million or 2 million.

Mr. BENNETT. You will concede then that there are no projects authorized for construction in S. 500 which would push the consumptive uses of water in the upper basin above the 7,500,000 apportionment, even after taking into account all the limitations and restrictions under the compact?

Mr. ELY. I think that is what I said in my prepared statement.

Mr. BENNETT. Is it your understanding that the plan of the Bureau with respect to the storage units involved in this bill is based on supplying average figures over a 20- to 35-year period, derived from this table to which you referred earlier?

Mr. ELY. I think maybe we are talking about two different things. The holdover storage, as I understand it, is calculated on the assumption that water could be successfully held over from 20 to 35 years. Is that your question?

Mr. BENNETT. Yes.

Mr. ELY. However, I don't want to get in too much detail in trying to amplify that answer. It is an engineering subject and is rather complicated.

Mr. BENNETT. But it is your contention that the project before this committee involves an assumption that supplying 7½ million acre-feet of water on a 20- to 35-year average is what the Bureau claims it can do and still meet its obligations to the lower basin? Is that your contention?

Mr. ELY. No. I think we are at cross purposes here. If I understand correctly, the Bureau now assumes that the obligation under the contract of the lower basin at Lee Ferry is only 75 million acre-feet every 10 years, and that the upper basin may keep and use everything else. It proposes to use, as "apportioned," as much as 9,400,000 in some years.

We say the reverse; that the upper basin may use up to 7½ million in any 1 year and everything else must come downstream.

As I mentioned earlier, the contention of some upper basin spokesmen seems to go further, that they are not obligated to deliver 75 million acre-feet in 10 years if that would interfere with their use of 7,500,000 per annum.

Mr. BENNETT. Here again we come back to the point that the section 1 projects would not come anywhere near using 7,500,000 acre-feet of water in the upper basin; is that correct?

Mr. ELY. There is no argument about that. The trouble is with the built-in assumptions and interpretations that go with those projects. If this bill involved only the section 1 projects, and stopped at that point, much of this discussion would not be necessary.

Mr. BENNETT. You indicate your fears arising out of the present litigation between Arizona and California. With respect to the burden both on California and the upper basin in meeting the Mexican Treaty obligations. Would you say that on the average that burden would be anything like 750,000 acre-feet per year, so far as the upper basin is concerned?

Mr. ELY. If Arizona wins the lawsuit, it is. If Arizona is right, the 75 million is the same as the 7,500,000. It is all apportioned. There is no water for Mexico in it. At once the upper basin has to add 750,000 acre-feet or more per year.

Mr. BENNETT. Does that assume there would be no return flow at the Mexican border?

Mr. ELY. We think that that is why Arizona is wrong, that you cannot identify the 75 million and the 7,500,000 that way because, if the lower basin diverts 75 million in 10 years, we surely are not charged with all that, because we are entitled to credit for return flow, and if that was the full resource of the lower basin, then by diverting 75 million in 10 years we would not get the beneficial consumptive use of 7,500,000 per year. The Bureau of Reclamation and the State Department told the Senate that they expected, I think, 900,000 acre-feet per annum of return flow at the Mexican border. You cannot make the books come out right on Arizona's theory, no matter how you treat the Gila, but there is no use arguing the case here.

Mr. BENNETT. On page 20 of your statement, you repeat, for I think the second time, the allegation that the upper basin view is that if it allows 75 million acre-feet of water each 10-year period to pass Lee Ferry, it is entitled to keep and use what is left.

Are you aware of any responsible water authorities in the States, or say, members of responsible congressional committees, who assert that broad a claim in the upper basin?

Mr. ELY. Yes, I have heard much broader claims asserted here in the last few days, namely, that you do not even have to let down the 75 million if it encroaches upon the upper basin use of 7,500,000 per year.

While you were not speaking from manuscript the other day, I gathered that your interpretation was that the 75-million guaranty in III (d) and the 7,500,000 apportionment to the upper basin in III (a) had to be read together, and that the 75 million did not necessarily take preference over the 7,500,000. So I would say that the answer to your question is "Yes," there are responsible spokesmen who do go this far, and further.

Mr. BENNETT. If there was any lack of clarification in my statement, I would like to point out that I was directing myself to only one point; namely, the effect of article III (e) on article III (d). I was pointing out that your interpretation placed on article III (e) would make the accomplishment of article III (d) impossible, so far as

the upper basin was concerned, without charging some water to meet that III (d) requirement to the upper basin's own water apportionment of 7,500,000.

I did not intend by any means to express any opinion that the commitment in article III (d) is not an independent commitment. I was not dealing with that point.

Mr. ELY. I am glad to hear that.

Mr. BENNETT. Is it your contention that this bill would authorize the operation of the projects in such a manner as to permit anyone to hold back water for the generation of power, even though there were needs for that water for domestic or agricultural purposes in the lower basin?

Mr. ELY. Yes, if the proponents say the obligation is only to let down 75 million in every 10-year period, and withhold the balance for power generation. The requirements in the lower basin are in excess of 75 million every 10 years for agricultural and domestic use. Part of it is admittedly excess or surplus.

Mr. BENNETT. We are speaking here of course of the projects which would be authorized in this bill.

Mr. ELY. I suppose by that you mean the six storage dams, as well as the participating projects, and my answer is related primarily to the storage projects.

Mr. BENNETT. Then again you would want to reiterate your position that you do not think section 12 of this bill is actual protection for agricultural and domestic users in the lower basin even though the total uses out of the main stem of the river are only around 6 million acre-feet of water at the present time.

Mr. ELY. Yes; it is not adequate protection, in my view.

Mr. BENNETT. You say "Not adequate protection"?

Mr. ELY. I said "Not adequate protection."

Mr. BENNETT. I think the committee is probably very much interested in having your ideas with respect to what would be adequate protection, since a good deal of the language of section 8 and section 12 is paraphrased from amendments which California people suggested last year.

I know we would be interested at the Department. I cannot speak for the committee.

Senator ANDERSON. I would supplement that and say that the committee would be very happy to have suggestions on it. The other day Governor Johnson opened up a whole new field when he suggested that there was no way to get the money out of the pot after it was put in there. That possibility had never occurred to me, certainly, and I doubt if it occurred to anybody else on the committee. There surely is no objection in trying to clarify it. There may be some points here that we can clarify without too great difficulty.

Mr. ELY. What we had in mind was that we would submit to Senator Kuchel, language which, if he approves it, he might take up with the committee at an appropriate time, to take care of some of these points. I would not want to attempt to spell them out off the cuff, but in general, what we are seeking is the language which will carry out what our witnesses have said here today, the adequate and, so far as we can, complete protection of our water rights.

Senator ANDERSON. In order that there may be no misunderstanding on the time schedule, may I say to you that I hope to have

the transcript ready for the printer within 10 days or possibly within 1 week from the present time, and to start having subcommittee consideration of it afterward. Senator Kuchel is not a member of this subcommittee, and he might ordinarily miss those things. We will try to make sure that he does have it, but, in any event, when you submit them to Senator Kuchel, will you make sure that the clerk of our committee has a copy of them as well, if that is agreeable to you.

Senator KUCHEL. What do you do then? Do you have executive hearings of your subcommittee?

Senator ANDERSON. Yes.

Mr. ELY. If Senator Kuchel approves, he can pass them on.

When I answered before "to protect our water rights," I should have included there and would like to amend my answer to say "and the rights under our power contract."

Mr. BENNETT. On page 21 your attention was called previously to the statement that the upper basin claims a right to deprive the lower basin of all waters in the main stream in excess of 75 million acre-feet each 10-year period. This appears several times in your statement, and for that reason I bring it up again.

Senator KUCHEL. Where are you reading?

Mr. BENNETT. The bottom of page 21 and the top of page 22. It is not your contention, however, that the projects authorized in section 1 would in anyway involve using all the water in the river in excess of 75 million acre-feet in any 10-year period. In fact they will not come anywhere near using 75 million.

Mr. ELY. Let me emphasize that this result would happen to us at once in consequence of the construction of storage reservoirs. It would persist for a protracted period of filling and thereafter would be a continuing and recurring threat against the permanency of our water rights. If it can be done once, it can be done again, and the bill declares the intention to do it again through the completion of more participating projects, at a later time.

Senator ANDERSON. I do want to put in the record at that point, however, that the Upper Colorado River Basin Commission has never made any such claim, and I just asked Mr. Wood, to be sure that we had it. So far as I know, no State official has made it and no Commission has made it. I realize your anticipation that it possibly could be made at a future date.

Mr. ELY. Of course, without protracting the discussion, we all realize that was said here the other day by some of the upper basin spokesmen present, that the 75 million acre-feet guaranty does not take precedence over the 7,500,000 apportionment of the upper basin, carries with it that implication.

Mr. BENNETT. Could the statements to which you refer also have means merely that the upper basin was asserting a right to use the full 7,500,000 if there were adequate storage to meet the commitments to the lower basin, whatever they might be?

Mr. ELY. What the ultimate position of the upper basin States may be, I am unable to say. We hope to find out, if we can force them to file pleadings in our lawsuit.

Mr. BENNETT. However we are trying to find out here just one question, and that is whether we have to find out all those things in order to authorize the projects named in section No. 1.

Mr. ELY. If I may say so, I think it is to the interest of the Congress to wait until you do see the formal position of the upper basin States in their pleadings.

Mr. BENNETT. At one point your fears with respect to section 2 of the bill, the declaration of policy, led you to point out the possibility of transmountain diversions of 2 million acre-feet per year in the State of Colorado alone, if I remember correctly?

Mr. ELY. Yes, sir.

Mr. BENNETT. None of these projects to which you refer here are authorized in this bill, are they?

Mr. ELY. I think you are correct. I am referring to the inventory in House Document 419. Some of them are built or building or pending under other acts of Congress.

Mr. BENNETT. On page 25, in your conclusion, you summarize by saying that "The Colorado River storage project, as now planned"—and I assume that does not refer to just the projects in section 1 of this bill, but is the entire project plan as it was reported in 1950; is that correct?

Mr. ELY. That is correct, including the immediate impact of the withholding of the water in storage dams during the filling period.

Mr. BENNETT. Could you break down your estimate of the encroachments upon the compact amounting to 2 million acre-feet per year, so far as these individual issues are concerned? I believe we started with somewhere between 300,000 and 500,000 on the basis of different methods of measurement.

Mr. ELY. While there are others, there are two that make up the major part of that. Roughly 500,000 acre-feet is on account of the difference in measurement of consumptive use as between the depletion theory and measurement at the site of use. The other major item is the substitution of the average for the annual limitation of 7,500,000 acre-feet. I should say with respect to the latter that there is a further complication, that the assumption of the Bureau, I understand, from our engineers, is apparently that the use of water in the upper basin will be higher in the wet years and lower in the dry years, which we do not completely follow, and which makes it rather difficult to evaluate the forecasts of actual use.

I should add that the immediate impact, as compared with the long-term effect, results from the apparent intention to release to use only 7,500,000 acre-feet per year from Glen Canyon during the filling period instead of the quantity assumed in our power and water contracts and the Mexican Water Treaty, which approximates 10 million a year.

Mr. BENNETT. In the driest 10-year cycle so far, you referred to in your statement, the flow at Lee Ferry was more than 100 million acre-feet of water over a 10-year period; is that correct?

Mr. ELY. That is correct.

Mr. BENNETT. That assumes a depletion of around 2,500,000 acre-feet per year at that time in the upper basin?

Mr. ELY. 2 million to 2,500,000.

Mr. BENNETT. In which decade was that?

Mr. ELY. 1931 to 1940.

Mr. BENNETT. In that period, presumably you would have had 25 million acre-feet available for storage. Is that your deduction?

Mr. ELY. 100 million came past Lee Ferry after the upper basin used during that period 20 million to 25 million.

Mr. BENNETT. One other point:

Some emphasis was given to Indian rights in your statement. You are aware of the fact, are you not, that there was a schedule of Indian claims attached to the pleading of the United States in the litigation, *Arizona* v. *California*?

Mr. ELY. Yes, sir.

Mr. BENNETT. Do you recall offhand the approximate total of diversions claimed on tributaries of that stream which would never be available in the main stream?

Mr. ELY. I do not have the Government petition here. Do you have a copy?

Mr. BENNETT. I do not have a copy of the petition. I understand this is the same chart, but I am not certain of that.

However, if these figures are accurate, which I have in front of me, and which were supplied by the Office of Indian Affairs, the diversions on the Gila River Basin would be 740,000 acre-feet of water.

Would you say that those diversions could in any way affect the uses of water in the upper basin, even if the United States contentions were sustained?

Mr. ELY. Yes, I do. The whole business of Indian claims is highly dangerous, whether the claims are on the tributaries or the main stream.

If the United States can claims water for the Indians outside the compact and ahead of it, then it is entitled to that much water irrespective of the claims of the State of Arizona.

Arizona seeks to acquire title to 3,800,000 acre-feet of water. She says 1 million of that is III (b) water, all in the Gila, and 2,800,000 in the main stream, all III (a) water.

The question squarely came up before the master in our one meeting with him when we insisted that the United States make its position clear, either that these claims are in or out of the compact, and we wanted them proven along with Arizona's claims, before we had to answer the case of either of them.

The Arizona representative at that time indicated—and I am referring to memory, not to anything written before me—that Arizona could not live with the result if the Indian claims were chargeable against her share of compact water, unless she got the full amount she was claiming. Consequently the question of whether Indian claims on the Gila are or are not counted in the total uses, which in turn determines the total amount of surplus—does affect the upper basin, with respect to the Mexican burden.

Mr. BENNETT. At the most that would be half of 1,500,000 acre-feet of water per year.

Mr. ELY. I do not have the tabulation before me.

Mr. BENNETT. I am speaking of the Mexican burden, since the impact presumably is on the Mexican burden. I am thinking that the maximum would be 750,000 that it might cost the upper basin.

Mr. ELY. I just would not attempt to translate it. The effect of the Indian claims is too large an enigma.

In the lower basin we know the claims of diversion rights, whatever that means, are 1,700,000, and in the upper basin we have seen

tabulations running about 1 million. What they will claim I do not know.

Senator ANDERSON. Before Senator Kuchel starts in I want to say, Mr. Ely, that I appreciate very much your courtesy in permitting me to have Mr. Bennett make these interrogatories. Unfortunately the chairman of the subcommittee this year is not a lawyer, and when it came to these legal questions I felt that I could not do it.

The matter of the Department of the Interior and the Bureau of Reclamation is involved, and I thought that the legal counsel might properly do it.

I think if you wanted to properly insist upon your rights, you could have refused to answer the questions, and I therefore appreciate your courtesy in allowing us to develop information on this. That is the purpose of the questions, and I just wanted the record to show that I appreciated very much your courtesy in this matter.

Mr. ELY. Thank you, Senator Anderson. From the way you have cross-examined me and other California witnesses, I think you are a highly competent cross-examiner. Mr. Bennett's questions have been very courteous and fair, and it has been a pleasure to try to answer them. The proceeding has been entirely in order.

Senator ANDERSON. Senator Kuchel?

Senator KUCHEL. I have a request to make of the chairman, but, first, I am going to say, Mr. Ely, I think not only your statement but the discussion here has pretty well indicated the thoroughness on which you and the people of our State base their contentions in this case. It will be of extreme help to me in presenting those views later on.

Senator ANDERSON. With reference to the request made by Senator Kuchel in this morning's session for certain material from the Department of the Interior and the Bureau of Reclamation, in order that the fullest possible information shall be available, the request can be modified or extended by Mr. Ely, representing the State of California when the request is made of the Department.

Senator KUCHEL. Can that be done by letter form, with a copy sent to the committee for its records? Then we will be specific.

Mr. ELY. We will do it in that way. What we would like to specifically request to have amplified is to include the dates when construction would be started on each unit, including not only the storage dams but the participating projects. If other participating projects are to be considered by way of amendment, then we would like to have the same information on that. We would like to have the date of construction to be completed, and operations started, as well as the allocation information requested this morning, and we particularly want to see the payout schedules, as to how the expectation will be carried out that Mr. Larson expressed, the power and irrigational allocations should be repaid concurrently.

Senator ANDERSON. If there is no objection to those requests, they will be made a part of the record.

Mr. BENNETT. I want to make one statement. I do not know that we necessarily have all that information, for all of the storage units in this bill, for the reason that the Department recommended authorization of 2 of those 6. I am not sure that we can have all that information available in the time that Senator Anderson wants it, but we will certainly give you everything we have.

Senator ANDERSON. All we can request is what information you can supply. Angels can do no more. And if any additional information is desired, Senator Kuchel, it shall be done by letter addressed to me, so that there will not be any question as to what has been requested and what we supplied.

Mr. ELY. We may have some supplemental questions on water operations of the project, which we will try to cover by letter.

Senator KUCHEL. Just one more thing that I think we can clear up now, because one of the agencies in Los Angeles is most interested in the data respecting Glen Canyon Dam.

Mr. Larson very graciously had photostated a copy of the December 5, 1949, Bureau of Reclamation report from Denver, Colo., on Glen Canyon, including certain technical data.

I wanted to be sure that if there was anything in addition to this subsequent to this report that was available, the record would have it included in it.

If the field reports are not to be reduced to writing, we cannot have them. I reacognize the burden placed on the Department in this request, but to the extent that there might be any more additional. I would like to ask for them.

Frankly, I do it because of the apprehension that was raised by the letter of the Secretary to which I referred the other day.

May I then request, Mr. Chairman, that if there are any further data in any of the field offices that can be made a part of the record, that they likewise be included?

Mr. BENNETT. I do not know whether we have any more or not, but we will look for it.

Is that all?

Senator KUCHEL. This is all I have, what is right in front of me, and I would like to submit this, Mr. Chairman, for the record, and then repeat my request that if there is any further information on Glen Canyon by way of reports or otherwise that could be added to the record, I would like that the Department furnish those to the committee for the hearing and the report.

Senator ANDERSON. I do not wish to object to this, but are we going to put the reports on every one of these projects in the record?

Senator KUCHEL. No; this is on Glen Canyon only. It was raised primarily by reason of the Secretary's letter in which he raised some serious questions, we thought, with respect to Glen Canyon.

Senator ANDERSON. Very well. I announced before these reports came in when I hoped to go to press with this report, and if we get caught in furnishing materials that run beyond that date it is just too late, because we are trying to get these things underway.

Senator KUCHEL. I would like to ask the chairman if the information is not available at printtime, that it be made available to the chairman and thus to the Members of the Senate.

Senator ANDERSON. With that understanding, these things will be done.

(See letter, p. 555.)

Mr. ELY. Mr. Chairman, may I add as exhibits to my statement a number of items?

I would like to include, if you will be so indulgent, a copy of our motion to join the upper States, our brief in support of that position, our reply brief, a resolution of the Colorado River board in opposi-

tion to the legislation of last year, and a list of the organizations which have filed resolutions in opposition.

Senator ANDERSON. Let me understand. If we start in, do we put in all the pleadings in this case, or how much?

Mr. ELY. That is up to you, of course, Mr. Chairman.

Senator ANDERSON. I have tried, Mr. Ely, to not burden these records with a lot of material that is available elsewhere. I am not trying to shut you off.

Mr. ELY. I realize that.

Senator ANDERSON. If you will try to see that we get in here material that is not easily available elsewhere, then I have no objection to it, but I would hate to reprint documents because it just leads to going back and forth. You put yours in and Arizona puts in theirs and you say "We subsequently issued another brief on that."

Mr. ELY. I think your comment is perfectly fair. Suppose we furnish you for each member of the committee, copies of our briefs. If the other side wants to do the same, they are welcome to do so, and I would suggest that we simply ask to have printed here the statement of issues which attempts to summarize it.

Senator ANDERSON. I appreciate that, and it will be done in that fashion.

IN THE SUPREME COURT OF THE UNITED STATES

OCTOBER TERM, 1953—NO. 10 ORIGINAL

STATE OF ARIZONA, Complainant, *vs.* STATE OF CALIFORNIA, PALO VERDE IRRIGATION DISTRICT, IMPERIAL IRRIGATION DISTRICT, COACHELLA VALLEY COUNTY WATER DISTRICT, METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA, CITY OF LOS ANGELES, CALIFORNIA, CITY OF SAN DIEGO, CALIFORNIA, AND COUNTY OF SAN DIEGO, CALIFORNIA, Defendants. UNITED STATES OF AMERICA, Intervener.

SUMMARY OF THE CONTROVERSY (EXHIBIT A)

(As appended to Answer of California Defendants to Petition of Intervention on Behalf of the United States.)

The pleadings filed by Arizona, Nevada, the United States, and California, to date, disclose complex questions of fact and law, many of which are interrelated. The summary of principal questions presented below is divided into four parts: (I) the quantities of water in controversy; (II) the ultimate issues, from the standpoint of the respective prayers; (III) a tabulation of factual issues; and (IV) the issues of interpretation of the basic documents involved. Under this division, certain questions reappear and to this extent reflect the interlocking nature of the problem.

I. THE QUANTITIES OF WATER IN CONTROVERSY

The United States seeks to quiet title to rights to the use of water, consumptive and otherwise, "as against the parties to this cause," for federal purposes, in unstated amounts.

Arizona seeks to quiet title to the beneficial consumptive use of 3,800,000 acre-feet per annum of the waters of the Colorado River System (measured by "man-made depletion of the virgin flow of the main stream") and to enjoin California's right to permanently use any water in excess of approximately 3,800,000 acre-feet per annum (measured by "diversions less returns to the river"), that being the effect of (1) reducing 4,400,000 acre-feet of III (a) water by reservoir losses, and (2) denying California any permanent right to use excess or surplus waters.

California asserts a right to the beneficial consumptive use in California of 5,362,000 acre-feet per annum of the waters of the Colorado River System (measured by "diversions less returns to the river") under contracts with the United

States, comprising 4,400,000 acre-feet of the waters apportioned by Article III (a) of the Colorado River Compact and 962,000 acre-feet per annum of the excess or surplus waters unapportioned by the Compact, including in such excess or surplus the "increase of use" permitted to the Lower Basin by Article III (b) of the Compact.

Nevada seeks to quiet title to 539,100 acre-feet per annum (measured in part by both methods) of the beneficial consumptive uses apportioned by Article III (a) of the Colorado River Compact, and to not less than a total of 900,000 acre-feet from all classes of water.

As the States differ in their definition of "beneficial consumptive use," their claims require restatement in terms of a common denominator in order to evaluate their effects. Thus:

The quantity to which Arizona seeks to quiet title, 3,800,000 acre-feet per annum, measured by the method she urges, "depletion of the virgin flow of the main stream occasioned by the activities of man," is equivalent to more than 5,000,000 acre-feet measured by consumption at the site of use or "diversions less returns to the river," the standard established by the Boulder Canyon Project Act and asserted by California. The difference is due primarily to the fact that under Arizona's interpretation, the Compact deals with the virgin flow in the main stream only and that the use of water "salvaged by man' is not charged as a beneficial consumptive use, whereas under California's interpretation the Compact deals with the waters of the entire river system and such salvage is so charged.

Conversely, the aggregate of the California contracts, 5,362,000 acre-feet per annum, measured by "diversions less returns to the river," is equivalent to only about 4,500,000 acre-feet measured by "man-made depletion" (without charge for salvaged water). If Arizona's prayer should be granted, California's rights would be reduced to about 3,800,000 acre-feet per annum, measured by "diversions less returns to the river," or to about 3,000,000 acre-feet measured in terms of "depletion of the virgin flow of the main stream."

The impact of Nevada's claims on those of othe other states is not readily evaluated.

II. ULTIMATE ISSUES

The ultimate issues, in the sense of the results sought by each party, may be grouped as follows:

The United States

Does the United States have rights, "as against the parties to this cause, to the use of water in the Colorado River and its tributaries" in the following categories?

(1) for consumptive use of all projects in the Lower Basin, which it asserts independently of any rights claimed by the States in which such projects are located;

(2) to fulfill its obligations arising from international treaties and conventions; but this involves, with respect to the burden of the Mexican Water Treaty, the obligations as between the States of the Upper Division and the States of the Lower Division under Articles III(c) and III(d) of the Colorado River Compact, and involves also the effect of the so-called "escape clause" of Article 10 of that Treaty, which allows reduction in the guaranteed deliveries to Mexico, in the event of extraordinary drought, in the same proportion as consumptive uses in the United States are reduced, "consumptive uses" being defined in Article 1 of the Treaty;

(3) to fulfill all its contracts for the delivery of water and electric power, i. e., with or in Arizona, California, and Nevada; but it alleges that the water available is not sufficient to satisfy all these obligations;

(4) to fulfill the Government's obligations to Indians and Indian Tribes; but this involves not only the questions of the magnitude and priorties of these claims but the questions of whether or not they are chargeable under the Colorado River Compact to the Basin and State in which such uses are made, what the obligation of the Upper Division States may be to release water for use by Indians in the Lower Basin, and what rights the United States may have to withhold water in reservoirs in the Upper Basin for use by Indians in both Basins;

(5) to protect its interests in fish and wildlife, flood control and navigation; but such rights as it may have for these purposes may require the impounding and release of water from reservoirs in both Basins, and not

merely reservoirs bordering or within Arizona and California, and again involves the question of accounting under the Compact; and

(6) for use of the National Park Service, Bureau of Land Management, and Forest Service; but if the United States has claims " as against the parties to this cause" for these functions, such claims apply to all the waters of the Colorado River System in both Basins.

The adjudication of these claims of the United States requires consideration and resolution of: questions of fact, referred to later; the power of the United States to impound and dispose of water independently of rights derived from the States; the extent of its obligations under treaties and contracts; the impact and effect of its treaties upon rights of domestic water users; how its claims to the use of water shall be measured; the location, magnitude and priorities of Indian claims, and claims for other alleged federal purposes; the extent to which its rights and obligations are controlled by the Colorado River Compact; and the extent to which its claims may be exercised in futuro in derogation of intervening rights and uses.

Arizona

Is Arizona entitled to a decree?

(1) Quieting title to 2,800,000 acre-feet per annum of the beneficial consumptive uses apportioned to the Lower Basin by Article III (a) of the Colorado River Compact, substantially all to be taken from the main stream, and measured in terms of man-made depletion of the virgin flow of the main stream?

(2) Quieting title to all of the 1,000,000 acre-feet per annum by which the Lower Basin is permitted to "increase its use" by Article III (b) of the Colorado River Compact (notwithstanding the decision of this Court in *Arizona* v. *California et al.*, 292 U. S. 341 (1934)), to the exclusion of the other States of the Lower Basin, all to be taken from the waters flowing in the Gila River, and to be measured in terms of man-made depletion of the virgin flow of the main stream?

(3) Reducing California's right to the uses apportioned by Article III (a) of the Colorado River Compact to approximately 3,800,000 acre-feet per annum, in consequence of reservoir losses?

(4) Enjoining California's right to receive and permanently use under its government contracts 962,000 acre-feet per annum, or any part thereof, in excess of 4,400,000 acre-feet per annum?

The determination of Arizona's claims involves: the questions of fact, later referred to; the standing of Arizona to seek a declaratory decree quieting title to a "block" of water for projects not yet constructed or authorized (about 1,600,000 acre-feet per annum of the 2,800,000 claimed from the main stream); the source of title to Arizona's claims to 2,800,000 acre-feet of III (a) water and 1,000,000 acre-feet of III (b) water; the status of the uses on the Gila; the measurement of uses thereof and of the main stream; whether Arizona's status is that of a party to the Colorado River Compact or that of a third party beneficiary of the Statutory Compact between the United States and California, and if so, whether Arizona is bound by the interpretations placed thereon by the principal parties thereto in its formulation and administration; and the validity and effect of Arizona's water delivery contract with the United States.

Most of the questions posed by Arizona's claims revolve around the issue of whether the Gila River shall be treated as a part of the Colorado River System for all purposes, or shall receive special treatment in respect of (1) the identification of uses thereon with the waters referred to in Article III (b); (2) the corollary exemption of "rights which may now exist" on the Gila from any charge under Article III (a); and (3) the devaluation of the charge for beneficial consumptive uses from the quantity which is in fact consumed on the Gila (alleged by California to be about 2,000,000 acre-feet per annum) to the lesser quantity represented by the resulting depletion in the virgin flow of the main stream (alleged by Arizona to be about 1,000,000 acre-feet per annum).

California

Are the contracts between the United States and the defendant public agencies of California for the storage and delivery of water valid and enforceable? Inasmuch as these contracts are, in terms, for permanent service but subject to the Colorado River Compact, the Boulder Canyon Project Act and the California Limitation Act, the issue is whether these enactments, considered together as a Statutory Compact established by reciprocal legislation, authorize and permit the Secretary of the Interior to presently contract for the storage and delivery for permanent beneficial consumptive use in California, of 4,400,000

acre-feet per annum of the waters apportioned by Article III(a) of the Colorado River Compact plus one-half of the excess or surplus waters unapportioned by the Compact, including in such excess or surplus the "increase of use" permitted to the Lower Basin by Article III(b) of the Compact. The aggregate of these contracted quantities, subject to physical availability of the amounts of excess or surplus waters, which vary from year to year, is 5,362,000 acre-feet per annum.

The determination of California's claims involves: the questions of fact, later referred to; the extent to which rights have vested in both the United States and California under the Statutory Compact; whether Arizona is estopped by her previous conduct from asserting her present position; whether the limitation is net of reservoir losses; how California's uses shall be measured; whether California is chargeable with the use of salvaged water; the effect of California's appropriations in their relation to the expressions "rights which may now exist" and "present perfected rights" in the Compact and Project Act; the definition of the Project Act term, "excess or surplus waters unapportioned by" the Colorado River Compact; the availability of such waters for permanent service; the intent of Congress with respect to the waters referred to in Article III(b); and the relation between California's contracts and the later agreements which the Secretary of the Interior has entered into with others.

Nevada

Is Nevada entitled to a decree:

(1) Quieting title to 539,100 acre-feet per annum of the beneficial consumptive uses apportioned to the Lower Basin by Article III(a) of the Colorado River Compact?

(2) Reserving for a future agreement the disposition of the use of the 1,000,000 acre-feet referred to in Article III(b) of the Colorado River Compact, and preserving to Nevada an equitable share thereof?

(3) Assuring Nevada the ultimate beneficial consumptive use of not less than 900,000 acre-feet per annum, from all classes of water?

The determination of Nevada's claims requires the consideration and resolution of: the questions of fact later referred to; the questions of interpretation previously mentioned; the question of whether Nevada's share of III (a) waters has been determined or limited to 300,000 acre-feet per annum; whether, as to stored waters, Nevada may claim any quantity in excess of her contracts with the United States; and the source of title to her claims to 539,100 acre-feet per annum of III (a) water and not less than 900,000 acre-feet per annum from all sources.

Interests of other States

There remains the question whether the claims of the United States, Arizona, California, and Nevada can be effectively determined without concurrently determining the rights and obligations of Utah and New Mexico with respect to the waters of the Lower Basin, and the rights and obligations of those States and Colorado and Wyoming with respect to other waters of the Colorado River System, to the extent that they are affected by the issues in controversy here.

In more detail, these "ultimate issues" depend upon the resolution of the following questions of fact and of the interpretation of the Colorado River Compact, the Boulder Canyon Project Act, the Statutory Compact between the United States and California, and the Mexican Water Treaty.

III. FACTUAL ISSUES

There are substantial issues of fact, raised by the pleadings to date. These include, but are not limited to, determination of:

(1) the investments and obligations undertaken by the parties in the construction of works and in the performance of their contracts with the United States, and the investments and obligations undertaken by the United States in reliance upon such contracts;

(2) the location, magnitude and priorities of the water rights necessary to enable the United States to perform its obligations to Indians and Indian tribes pursuant to Article VII of the Compact;

(3) the requirements of the United States for (a) flood control, (b) navigation, (c) fish and wild life, and (d) the other claims which it makes;

(4) the quantities of water physically available for beneficial consumptive use in the Lower Basin, assuming full use by the Upper Basin of its Compact apportionment, full regulation of the supply available to the Lower Basin, and full performance of the Mexican Water Treaty;

(5) the uses, present and potential, on the main stream and on each tributary, determined as of the place of use, as California contends is the proper method, and the effect of those uses in terms of man-made depletion of the virgin flow of the main stream, as Arizona contends is the proper method;

(6) the quantities of water "salvaged" by the activities of man, on the main stream and on the tributaries;

(7) reservoir losses, present and potential, gross and net;

(8) appropriative rights, priorities, and uses thereunder, on the main stream and tributaries;

(9) the extent and place of use of "rights which may now exist" and which, under Article III (a) of the Compact, are to be charged as uses of water apportioned by Article III (a), and of "rights which may now exist" in California, within the meaning of Section 4 (a) of the Project Act; and

(10) the extent and place of use of "present perfected rights" protected by Article VIII of the Compact and directed by the Boulder Canyon Project Act to be satisfied in the operation and management of the Project.

IV. THE ISSUES OF INTERPRETATION OF THE COLORADO RIVER COMPACT, THE BOULDER CANYON PROJECT ACT, THE STATUTORY COMPACT, AND THE MEXICAN WATER TREATY

Questions relating primarily to Article III (a) of the Colorado River Compact include the following: Whether the Colorado River Compact deals only with the main stream or treats with Colorado River System waters wherever they may be found; whether the uses apportioned by Article III (a) to the Lower Basin are to be taken only from "water present in the main stream and flowing at Lee Ferry," as Arizona contends, or from the tributaries as well, as California and Nevada contend; whether the 7,500,000 acre-feet referred to in Article III (a) is related to the 75,000,000 acre-feet referred to in Article III (d), as Arizona contends, or whether the latter figure includes excess or surplus waters, unapportioned by the Compact, as California contends; by what process Arizona claims to have acquired an apportionment of 2,800,000 acre-feet of Article III (a) water, to be taken from the main stream; whether the apportionment of 7,500,000 acre-feet "per annum" is a statement of a maximum, or of an average, and, if the latter, over what period of years; the definition and measurement of "beneficial consumptive use"; the accounting for water added to and withdrawn from storage on the main stream and tributaries; whether the use of water salvaged by man on the main stream and tributaries is to be charged under the Compact; the definition of "rights which may now exist," which are to be included in charges to water apportioned by Article III (a) and their magnitude on the main stream and tributaries; the date to which this last expresson refers; whether, in the absence of a compact among the Lower Basin States, the division of water among them is to be affected by appropriated rights, i. e., "rights which may now exist"; whether Indian rights, and other federal claims to consumptive use, are included within that expression and are to be charged under the Compact; whether reservoir losses are chargeable as beneficial consumptive uses, and if so, their classification under the Compact and their relation to other uses.

Questions relating primarily to Article III (b) of the Colorado River Compact include the following: The questions relating to the definition of "beneficial consumptive use" and "per annum" previously stated in connection with Article III (a); whether the "increase of use" permitted to the Lower Basin by Article III (b) is an apportionment in perpetuity as in Article III (a), as Arizona contends, or a license to acquire rights by appropriation and contracts under the Project Act in excess or surplus waters unapportioned by the Compact, as California contends; whether this right to increased use is identified solely with the water found flowing in the Gila River, as Arizona contends, or is identified with the first 1,000,000 acre-feet of increased use (above 7,500,000) per annum throughout the Lower Basin, as California and Nevada contend; whether this right is available to all five States of the Lower Basin, or to Arizona alone, as she contends (notwithstanding the decision of this court in *Arizona* v. *California et al.*, 292 U. S. 341 (1934)); the status of uses in New Mexico on the Gila; the status of uses on other tributaries; and to what degree reservoir losses are chargeable to this increase of use. Reference to the relation of the Mexican Treaty burden to the uses under Article III (b) appears below in connection with Article III (c).

Questions relating primarily to Article III (c) of the Colorado River Compact include the following: Whether the waters to be supplied Mexico are "apportioned" thereby (this bears upon the determination of the meaning of the

expression "excess or surplus waters unapportioned by" the Colorado River Compact, appearing in the Boulder Canyon Project Act, *infra*); whether, if the quantities in excess of those specified in Articles III (a) and III (b) are insufficient to supply the deliveries to Mexico, the burden, with respect to the Lower Basin, falls first upon the uses referred to in Article III (b), as California contends, or upon those referred to in Article III (a), as Arizona contends; and the relation of the "escape clause" in Article 10 of the Treaty, which permits reduction in deliveries to Mexico in case of extraordinary drought in proportion to the reduction in consumptive uses in the United States. The relation of Article III (c) to Articles III (d) and III (a), with respect to the obligations of the Upper Division States, is referred to below in connnection with Article III (d).

Questions relating primarily to Article III (d) of the Colorado River Compact include the following: As a corollary to one of the questions stated with reference to Article III (a), whether the 75,000,000 acre-feet referred to in Article III (d) is related to the 7,500,000 acre-feet apportioned by Article III (a) to the Lower Basin, or whether the 75,000,000 acre-feet include excess or surplus waters available for delivery to Mexico or use in the Lower Basin; the resulting effect on the obligation of the States of the Upper Division stated in Article III (c) to furnish additional water to meet the deficiency if surplus above the quantities specified in Articles III (a) and III (b) is insufficient to supply Mexico; and whether the Lower Basin is entitled to demand release of this 75,000,000 acre-feet notwithstanding the consequent inability of the Upper Basin to make beneficial consumptive use of 7,500,000 acre-feet per annum.

Questions relating primarily to Article III (e) of the Colorado River Compact include the following: whether, if excess or surplus waters are appropriated (or contracted for) in the Lower Basin, their release from storage in the Upper Basin may be required; whether, if Indian uses are not subject to the Colorado River Compact, the United States may require release of water from reservoirs in the Upper Basin to satisfy them, in addition to the water which the States of the Upper Division are required to release in performance of Articles III (c) and III (d) of the Compact; so also with respect to the other federal claims asserted by the United States "as against the parties to this cause," for use of water in the Lower Basin.

Questions relating primarily to Articles III (f) and III (g) of the Colorado River Compact include the following: whether the provisions in these articles with reference to a compact to be made after October 1, 1963, are permissive or mandatory; whether, in the light of the Statutory Compact, these provisions preclude the acquisition of rights in excess or surplus waters by appropriation and by contract with the United States in the interim, subject only to further apportionment as between Basins by such a future compact; and whether, in the event of competing interstate claims to such excess or surplus waters, in the absence of a compact apportioning them, priority of appropriation, including contracts with the United States, controls.

Questions relating to Article VII of the Colorado River Compact include the following: Whether uses by Indians are subject to the Colorado River Compact; whether Indian uses are chargeable under the Compact to the Basin and the State in which they are situate; if not, whether they are prior and superior to the apportionments made by the Compact, or are in competition with appropriations of others which are subject to the Compact; the location, magnitude, and asserted priority of Indian claims; their effect upon the quantities available to non-Indian users under Articles III (a), III (b), etc.; their effect on the distribution of the Mexican Treaty burden; and their effect on the obligations of the States of the Upper Division under Articles III (c) and III (d).

Questions relating primarily to Article VIII of the Colorado River Compact include the following: The date to which the expression "present perfected rights" relates, i. e., 1922, 1929, or some other date; the definition of said term; whether such definition is to be determined under the law of the State under which the right arose; whether the assurance against impairment extends to quality as well as quantity; the extent of these rights in each State; their relation to the expression "rights which may now exist," as used in Article III (a) of the Compact and Section 4 (a) of the Project Act; and the impact of reservoir losses when present "perfected rights" attach to, and are satisfied from stored waters, pursuant to the direction in Article VIII.

Questions relating primarily to the Boulder Canyon Project Act and the resulting Statutory Compact between the United States and California include the following: Whether the alternative consent given in the Project Act to a Seven-State or Six-State Compact became final on June 25, 1929, in establishing the latter; whether Arizona could, or did, effectively ratify a Seven-State Compact thereafter; if so, whether the Statutory Compact authorized by the Project Act as a corollary to a Six-State Compact remains in effect; if it does, whether Arizona can claim the benefits of both; whether the Statutory Compact authorized contracts to be made with the California defendants for the permanent service (in addition to 4,400,000 acre-feet of III (a) waters) of one-half of the excess or surplus waters unapportioned by the Compact for use in California; whether it included therein the waters referred to in Article III (b), or precluded California from use of such waters; whether the "excess or surplus," of which California may use one-half, is to be reckoned before or after deduction of the quantity required to be delivered to Mexico; the effect on California's right to "excess or surplus" of a future compact apportioning such waters; whether the limitation "for use in California" is net of reservoir losses, or is subject to further reduction in consequence of such losses; whether the definition of consumptive uses applicable to California is applicable to Arizona, and vice versa; whether California is free to make use of salvaged waters without charge under the Compact or the Limitation Act; the effect of California's appropriations; the meaning and effect of the reference to "rights which may now exist" in Section 4 (a) of the Project Act; the extent of California's "present perfected rights" as referred to in Section 6 of the Project Act; whether by the Project Act, or otherwise, the shares of Nevada or Arizona in the waters of the Colorado River System have been determined; and the construction and effect of the water delivery contracts held by those States.

Mr. ELY. We will not ask to have reprinted the many resolutions offered against this project when it was before you last year as S. 1555, but do ask that a list of the organizations on record as opposed to some if not all of the features or policies of this legislation be printed. Many of the resolutions were printed last year.

We also ask that you print the resolution of the Colorado River Board.

Senator ANDERSON. All right.

(The material referred to follows:)

OPPOSITION TO COLORADO RIVER STORAGE PROJECT (S. 1555, 83D CONG.)

At least some one, if not all, of the features or policies of this legislation have been opposed either during the course of the hearings, or through the submission of statements, the enactment of resolutions, or other pronouncements by the following:

Engineers Joint Council (a federation of the eight major engineering societies: American Society of Civil Engineers, American Institute of Mining and Metallurgical Engineers, the American Society of Mechanical Engineers, the American Water Works Association, American Institute of Electrical Engineers, the Society of Naval Architects and Marine Engineers, American Society for Engineering Education, and American Institute of Chemical Engineers)
American Public Power Association
Izaak Walton League
National Parks Association
The Wilderness Society
Sierra Club
The American Planning and Civic Association
National Wildlife Federation
Wildlife Management Institute

And the following California entities:

Colorado River Board of California
Imperial Irrigation District
Metropolitan Water District of Southern California
Los Angeles City Council
Department of Water and Power of the City of Los Angeles

San Diego County Water Authority
San Diego City Council
Imperial County Board of Supervisors
Imperial County Farm Bureau
Holtville Chamber of Commerce
Calexico Chamber of Commerce
Calexico City Council
Coachella Valley County Water District
Rainbow Municipal Water District, San Diego County
California State Chamber of Commerce, Southern California Council
Brawley Chamber of Commerce
Brawley City Council
Calipatria Chamber of Commerce
Westmorland City Council
Council of the City of Burbank
Board of Supervisors of Orange County
Board of Directors of the City of Pasadena
City Council of San Jacinto
City Council of Santa Ana
City Council of Torrance
City Council of Hemet
City Council of Glendale
City Council of Costa Mesa
City Council of Laguna Beach
City of Beverly Hills
City Council of Chino
City Council of Newport Beach
City Council of Compton
City Council of Ontario
City Council of Long Beach
City Council of Fullerton
City Council of Perris
Board of Supervisors of Los Angeles County
Council of the City of Anaheim
City Council of Santa Monica
City Council of San Marino
City Council of Fontana
City Council of Upland
Council of the City of Pomona
City Council of El Centro

Also:

Central Labor Council of Los Angeles
Railroad Brotherhood's Joint Legislative Council of California
Executive Committee, California State Grange
Property Owners' Association of California, Inc.
And the Los Angeles Clearing House Association

In addition, taxpayers' associations throughout the country have expressed alarm at the tremendous burden this legislation will place upon citizens everywhere to subsidize this project.

RESOLUTION OF THE COLORADO RIVER BOARD OF CALIFORNIA, JUNE 2, 1954

The Colorado River Board of California opposes the enactment of S. 1555 and H. R. 4449, 83d Congress, bills to authorize the Secretary of the Interior to construct, operate, and maintain initial units of the Colorado River storage project and participating projects, and for other purposes.

California favors the continuation of the development of the water resources of the Colorado River Basin on a sound economic basis, as the need for such development occurs. This State recognizes the right of the upper basin States to so utilize the waters apportioned to that basin by the Colorado River compact as approved by the Boulder Canyon Project Act, but subject to the terms and conditions of those documents as the Supreme Court may construe them in the case of *Arizona* v. *California* now pending.

By the same token, California, in the protection of its investment of nearly $700 million in water development projects which it has made in reliance upon the Colorado River compact and the Boulder Canyon Project Act, and the economy

and population of more than 4 million people dependent upon these works, must resist legislation which would encroach upon the rights recognized in the lower basin States by those documents.

The proposed Colorado River storage project legislation adversely affects the lower basin States in much the same way as would the proposed central Arizona project legislation. Both are based upon interpretations of the Colorado River compact and the Boulder Canyon Project Act with which California cannot agree and which are now at issue in the United States Supreme Court. Each of them contemplates developments which would encroach upon the Compact and Project Act, as interpreted at the time of enactment of those laws, to the extent of more than a million acre-feet per year. Both proposals are based upon unrealistic water supply estimates. Each is in conflict with the presentation made to the Senate by the supporters of the Mexican Water Treaty. Each ignores the legal claims which are in conflict with it, and both ignore the damage which their construction would cause to the investments already made by their neighbors. Each of these proposals is dependent upon Federal subsidies for irrigation amounting to many times the value of the land when fully developed, and most of these subsidies are concealed. Both would commit the Congress to new feasibility standards and pay-out formulas with which this Board and other California State agencies have officially expressed disapproval.

The Colorado River storage project would intercept the lower basin's water supply with giant reservoirs at Glen Canyon, Echo Park, and Curecanti, capable of storing several years' flow of the river. In the absence of statutory controls of the operation of such reservoirs designed to protect the output of firm power at Hoover Dam, upon which the United States and the power contractors relied, the use of such large storage could result in seriously curtailing the revenues at Hoover Dam and other dams on the lower river and upon which these lower projects depend for financing. It is against the best interest of both the power users in the lower basin and the Federal Treasury to so legislate.

Both Glen Canyon and Echo Park Reservoirs would be located downstream from any point of use by the proposed irrigation projects in the upper basin and their major purpose would be to provide revenues, commencing almost 50 years hence, to pay the capital cost, without interest, of the irrigation projects proposed for construction now. This postponement for nearly 50 years from the commencement of repayment of irrigation would result in a Federal subsidy amounting to over $2,500 per acre of irrigated land—an unwarranted and unjustified burden on the Nation's taxpayers.

California, as a major taxpaying State, is doubly affected, for the amount of the overdraft on the water supply of the Colorado River Basin is directly related to the amount of Federal subsidy to the irrigation projects creating the overdraft.

The bills delegate to the Secretary of the Interior power to resolve the feasibility of the participating irrigation projects. If reclamation feasibility standards are to be changed, that should be done by Congress, in general legislation, after the Hoover Commission has had an opportunity to report upon this very matter, heretofore committed to their study.

The proposed legislation includes some, and foreshadows other, large transmountain diversion projects in the upper basin using several million acre-feet of water annually, thereby impairing the quality as well as the quantity of the water available to the lower basin and to which the lower basin is entitled under the Colorado River compact.

For all these reasons, the Colorado River Board of California respectfully requests the representatives of this State in the Senate and House of Representatives of the United States to oppose the enactment of legislation to authorize construction of the Colorado River storage project and participating projects as proposed in these bills—S. 1555 and H. R. 4449—or similar legislation, and instructs its officers and staff to make the appropriate presentation of the views of this board to the congressional committees and executive agencies concerned with such legislation.

Senator ANDERSON. In that connection, I have here a telegram that came in this afternoon from Governor Johnson and some people from Colorado.

If they all want these to go in the record, I must say we have a lot of them, and I think we would like to take a look at the final printing

and if it looks to be too expensive we would just say that resolutions had been received, and if they are not too voluminous we might print some of them. These things cost money even though they go straight to the Government Printing Office, and they come out of your pocket and mine in the last analysis.

Mr. ELY. If you decide to print resolutions, we would like to have ours printed.

Senator ANDERSON. I have a folder full of them about this thing and I have not brought them into the record because a thousand dollars is a thousand dollars, I think, saved.

Mr. ELY. Some questions have been asked here about the Central Valley project. I have telegraphed for the figures and will ask you to include a summary of that in the record.

Senator ANDERSON. They will be placed in the record at this point.

(The material referred to follows:)

CENTRAL VALLEY PROJECT DATA

1. Total investment

A. As of Jan. 1, 1955 (From Bureau report released Mar. 3, 1955. This figure does not include expenditures by Corps of Engineers to Jan. 1, 1955, on Folsom Dam of $60,669,000. If added, this would bring total project investment as of Jan. 1, 1955, to $496,074,525.)	$435,405,525
B. Estimated investment for completed project (Including all authorized units such as Trinity. This figure latest released by Bureau for total cost but no breakdown of it available at this moment. Accordingly, figures which follow based on reports as identified.)	$750,071,106

2. Date of final payout

For initial units	Year 2006.
Including Trinity and Sacramento Canals	Year 2013.

3. Surplus

$170,678,200 (With Trinity and Sacramento Canals)	Through year 2013.

4. Use of interest component or Collbran formula

The interest component is not being applied on the Central Valley project. It was shown on Bureau reports through 1953. The three most recent reports on project units (Trinity, March 1954; San Luis, August 1954; Folsom South, February 1955), however, do not show any of the interest ($101,508,300) on power or interest ($21,326,500) on municipal and industrial water as used for the repayment of any capital costs.

The Reclamation Bureau reports show that the Collbran formula is now incorporated in the planning to the extent that power and municipal and industrial revenues may be used, after allocations to these purposes have been paid out with interest to repay about 17 percent of the irrigation allocation. (See 5 and 6 below.)

5. Allocations and manner of repayment with percentages

Purposes	1 Allocations	2 Percent of total cost	3 Amount to be repaid by each purpose	4 Percent of total to be repaid (col. 3)	5 Percent of repayment to total cost
Nonreimbursable:					
Navigation	$8,055,000				
Flood control	44,999,000				
Fish	1,478,000				
Total	54,532,000	6.7	0	0	0
Reimbursable:					
Irrigation	399,378,000	49.5	$324,392,500	43.2	40.2
Power	280,221,000	34.8	346,856,600	46.1	43.1
Municipal and industrial	20,782,000	2.6	29,131,900	3.9	3.6
Total	700,381,000		700,381,000		
Distribution systems	51,455,000	6.4	51,455,000	6.8	6.4
Grand total	806,368,000	100.0	751,836,000	100.0	93.3

6. Percentage to be paid by irrigators of amount allocated to irrigation, including distribution works

	Cost	Repay
Irrigation	$399,378,000	$324,392,500
Distribution systems	51,455,000	51,455,000
Total	450,833,000	375,847,500

Percentage of repayment, to cost, by irrigators equals 83.3 percent.

Source: Foregoing material re Central Valley project based upon information received by teletype dated Mar. 4, 1955, from the office of the executive officer, water project authority, State of California.

Mr. ELY. May I ask whether the Hill report has been printed in a form that is available for the Congress? We do not agree in all respects with it, but it is highly informative. It is 61 pages long, double spaced. I think it would be an informative part of your record.

Senator ANDERSON. I surely hate to put 61 pages into the record in one big batch.

Suppose we consider it?

Before we complete, I want to just read one sentence of a letter from Herbert Hoover to Delph Carpenter. I do not say this is of extreme importance, but it is on page A–103 of the Hoover Dam documents.

Delph Carpenter was asking about the use of the additional million acre-feet and no more:

> There is nothing in the compact to prevent the States of either basin using more water than the amount apportioned under paragarphs (a) and (b) of article III, but such use would be subject to the further apportionment provided for in paragraph (f) of article III, and would vest no rights under the present compact.

That is why I sort of questioned the statement about the upper States having no rights.

Mr. ELY. There is a somewhat similar statement in Mr. Hoover's answer to Senator Hayden's questionnaire of January 1923, with which you are familiar, and I will supply that citation for the record.

(For the citation referred to, see answers to questions 10 and 16 at pp. A36 and A39 of Hoover Dam documents (H. Doc. 717, 80th Cong.).)

Senator ANDERSON. Are there any more questions?

Senator KUCHEL. No, Mr. Chairman.

Senator ANDERSON. Thank you very much, Mr. Ely, for a very fine presentation of this whole question, and I appreciate the way in which you handled it.

Mr. ELY. Thank you, Mr. Chairman, and the committee, for your patience and courtesy, as always.

Senator ANDERSON. We will meet at 10:15 in the morning.

(Whereupon at 5:20 p. m., Friday, March 4, 1955, the committee recessed until 10:15 a. m., Saturday, March 5, 1955.)

COLORADO RIVER STORAGE PROJECT

SATURDAY, MARCH 5, 1955

UNITED STATES SENATE,
SUBCOMMITTEE ON IRRIGATION AND RECLAMATION OF
THE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS,
Washington, D. C.

The subcommittee met at 10:15 a. m., pursuant to recess, in the committee room, 224 Senate Office Building, Senator Clinton P. Anderson (New Mexico), presiding.

Present: Senators Clinton P. Anderson (New Mexico); Eugene D. Millikin (Colorado); Arthur V. Watkins (Utah); and Henry Dworshak (Idaho).

Present also: Stewart French, staff director and chief counsel; Goodrich W. Lineweaver, staff member for reclamation; William K. Coburn, staff member for public lands; James Gamble, staff member for Indian affairs; Richard L. Callaghan, chief clerk; N. D. McSherry, assistant chief clerk; and

Elmer Bennett, office of legislative counsel, Department of the Interior.

Senator ANDERSON. Mr. Penfold?

STATEMENT OF J. W. PENFOLD, WESTERN REPRESENTATIVE, IZAAK WALTON LEAGUE OF AMERICA, INC.

Mr. PENFOLD. Mr. Chairman and Senator Millikin, my name is Joseph W. Penfold. I am western representative for the Izaak Walton League of America. I live in Wheatridge, Colo., my office is in Denver. I appreciate very much the privilege of appearing before this committee to make a few comments about the upper Colorado River storage project on behalf of the Izaak Walton League. I appreciate very, very much also your holding the hearings over to Saturday morning at your inconvenience and that of your committee staff. In line with the request of the Chairman, I shall endeavor to avoid repetition of testimony which the league has already presented to Congress in previous hearings.

The Izaak Walton League is a nationwide membership organization dedicated to the protection and wise use of our Nation's soil, woods, waters, and wildlife. During our more than three decades of organization we have sought to be objective and broad in our viewpoint, and that wish has certainly motivated our position in this matter now before your committee. The upper Colorado project and one proposed unit of it—the Echo Park Dam—presents a very real and complex problem which the West and the Nation cannot avoid facing and one which the league cannot avoid facing either.

We have expressed ourselves many times before as emphatically opposed to authorization of Echo Park Dam. We reemphasize that same position here. This position of ours derives from the firm conviction that the kind of future we all wish to bequeath to our descendants is composed of many elements, among them the opportunity to enjoy and receive the full value of examples of God's handiwork modified as little as possible by man's activities. Clearly your distinguished predecessors had that very thought in mind when they set aside the national park areas and dedicated them to that principle for all time. In our opinion, Dinosaur National Monument fully measures up to the high quality set in all our fine national park areas. We believe it and they should be preserved for the purposes for which they were established.

We are also mindful that the Nation must utilize its material resources to meet the demands of an ever-increasing population. Izaak Walton League members must earn their living, raise families, and pay taxes, like everyone else. Our membership in the arid and semiarid West is just as conscious of the water resource problem as any other group of citizens. They have to live with it, too. So we have endeavored to look at the Echo Park controversy and the upper Colorado project from as broad a viewpoint as we can. We recognize that our future requires development of our water resources and we know our future will need national parks more than we can possibly imagine today.

We in the league have not been convinced that our choice lies between a decision to retain Dinosaur Monument and a decision to proceed with sound water development in the Colorado Basin. However, every effort has been made in my State to convince its citizens that such is our choice. We are told that if we retain the admittedly spectacular and irreplaceable canyons of Dinosaur the West and Colorado will be doomed to a future of drought and economic desiccation. This "education" program has been rather effective, too. It's amazing the number of Denver folk who sincerely believe that if Echo Park Dam is authorized, Denver will not have water rationing next summer.

Actually, that "either one or the other" choice is one we do not have to make. We can save our priceless water and we can at the same time save our priceless national park unit. There have been several very promising suggestions as to how this can be accomplished. I would like to mention briefly just one which seems to us to make a very great deal of sense.

Gov. Edwin C. Johnson, of Colorado, made the suggestion early this year when he met with the Governors of the other upper basin States in Cheyenne.

Governor Johnson proposed a very simple plan as an alternative to the plan you are now considering—that Congress at this time authorize the Glen Canyon Dam alone with the provision that its power earnings be earmarked for the construction of participating projects when and as they are determined to be desirable, necessary, and to meet the required standards of financial feasibility. He suggested that the power revenues be allocated to projects in the several States on the same basis as they have divided the waters of the upper basin by the upper basin compact.

The proposal is beautiful in its simplicity and it appears fully to meet for a considerable period of time the major objective of the

upper basin States—to provide sufficient holdover storage for downstream delivery and so protect the rights of the upper basin States to utilize consumptively their share of Colorado River waters.

Glen Canyon dam will store 26 million acre-feet and alone without any other holdover storage capacity will, except in a very long succession of low run-off years, provide sufficient storage to guarantee our downstream commitments. This storage requirement has been estimated as 23 million acre-feet.

Glen Canyon Dam also is the great power producer in the overall plan. With installed capacity of 800,000 kilowatts it would produce power at a low rate and in huge quantities. It is likely the only major dam in the whole proposed system which would produce enough revenue to pay out its own costs and earn substantial sums to assist in the construction of the participation projects.

In other words, this plan so ably presented by Governor Johnson, if authorized now would implement the most vital factor in the whole upper Colorado development program—protect the upper basin States' rights in the river and start earning income to effectuate those rights through the construction of water use projects as quickly as they are found to be sound and so approved. With Glen Canyon authorized and under way the pressure will be off, and the fear that we shall lose our water to the demands of downstream users will be eliminated. We can then proceed with further planning for development without the sense of desperate haste that seems to have characterized things the past few years.

I believe this proposal is conservative, makes sense, is reasonable and will be seen as reasonable by the rest of the country whose approval of our western plans is a necessity.

In that connection, I might interject, Mr. Chairman, that there appears to be no good reason for jeopardizing the development of the upper Colorado by insistence upon authorization of the Echo Park.

Other major dams can follow along in orderly fashion, Curecanti, Cross Mountain (or Juniper), Flaming Gorge, et cetera.

With Echo Park eliminated from the plan the project would receive firm support where before it has had only opposition. But that decision is not irrevocable. The Echo Park dam site will still be there, 100 or 1,000 years from now, if we ever find its use essential to the safety and security of the Nation.

With elimination of Echo Park the Nation can proceed with long overdue activity to develop Dinosaur National Monument as the great national park unit it is. It can be made accessible and usable for millions of people for a minimum of cost. So developed it will quickly become of vast economic importance to the great 3-State area around it. Independent studies of Yellowstone by the State of Wyoming and of Glacier by Montana demonstrate beyond a shadow of a doubt that the value is there.

While your committee at this time is dealing specifically with plans and programs for construction of water facilities, it isn't possible to separate construction from all the other elements that go into a whole water management program. In the Colorado drainage the water we are talking about for use in major portions of seven States originates on lands totaling but a small fraction of all concerned. These watershed areas comprise the West's most precious possessions. In our zeal

for this, that or the other water use project we are prone to forget that our ability to put water to beneficial use is determined in the last analysis on the quantity and quality of the water delivered to us by the watershed mechanism. May I give one quick illustration, on the other side of the divide but fully applicable throughout the Colorado drainage.

Experts have estimated that in the fine irrigation areas of the South Platte River, north of Denver, that the annual cost of silt in lost reservoir capacity, the out-of-pocket expense in removing silt from canals and laterals totals at least 50 cents for each acre of watershed furnishing the water. On each of those watershed acres we are spending now less than 3 cents each year on all activities and programs related to protection of those watersheds.

We are doing far too little in the manipulation of watershed cover for the production of greater water yields. We are far too complacent about the damage to watersheds in our heavy water producing areas from continued overgrazing by livestock, and in some areas by big game animals.

We are too complacent about water loss from seepage and from inefficient and wasteful irrigation practices, and the deterioration of good agricultural lands from the same causes.

If I may interject, a day or two ago there was a reference made to testimony which I gave before the House hearings last year and reference to water losses from seepage. I would just like to point out that those figures are correct and they refer to water which is lost between diversion point and the farmer's headgate, totaling some 22, nearly 23 million acre-feet in the State of Colorado.

Senator ANDERSON. I never did find out how you arrived at that. I am trying to find out, for example, how you would lose 2 million acre-feet in New Mexico between the turnout and the headgate.

Mr. PENFOLD. That is right, sir.

Senator ANDERSON. That is what you said, but how did you arrive at that?

Mr. PENFOLD. I did not arrive at it, sir. Those figures which were mentioned are taken from——

Senator ANDERSON. Somebody took them from you and you took them from somebody, and somebody else took them from somebody else, but somebody must have calculated them.

Mr. PENFOLD. It was a study by the Colorado A. and M. College, reported in their technical bulletin 38. I cannot vouch for the figures but I assume the scientists who made the study knew what they were doing.

Senator ANDERSON. The bulletin itself has never been introduced. We do not know that that is what they say or that there is a vast amount of loss of water as it runs through the canals, but some of that water returns to the river. I assume you are familiar with the way irrigation works?

Mr. PENFOLD. Yes, sir.

Senator ANDERSON. I know where there is water seeping from the ditch that water is not lost. It usually comes back to the river. I do not see how you can get a 2-million acre loss in the Rio Grande which does not carry 2-million acre-feet.

Mr. PENFOLD. I would be very glad to locate a copy of that bulletin.

Senator ANDERSON. I am going to try to locate it myself, but I thought since you read the figures, you might have read the bulletin.

Mr. PENFOLD. Indeed I did read the bulletin.

Senator ANDERSON. How did he calculate that?

Mr. PENFOLD. I imagine, I say I imagine because I do not recall specifically, an actual amount of water turned into an irrigation ditch, minus the amount which is actually released at the various farmers' headgates would indicate the loss of water between the diversion point and the farmer's headgate. These figures do not include excess water which is released onto the fields and proceeds on through and back as return flow.

Senator ANDERSON. We questioned that the other day, and you now say that since we questioned it you state they are right, but you have not checked them in the meanwhile.

Mr. PENFOLD. I have not the bulletin with me or I certainly would introduce it.

Senator ANDERSON. All right.

Mr. PENFOLD. It might be mentioned that in the West We have already lost far more fish producing waters and recreation areas from these causes than we shall lose to dried up streams and fluctuating reservoirs in the future.

In conclusion, may I urge that the Congress in its wisdom determine that an initial construction phase of water development in the upper Colorado be authorized, excluding the Echo Park Dam, and that we all recognize the even larger and more difficult job that lies ahead of us on the watersheds that comprise the basic resource with which we shall build our future.

Senator ANDERSON. Thank you.

Mr. PENFOLD. Thank you, gentlemen.

Senator ANDERSON. Congressman Baldwin?

Do you have a prepared statement?

STATEMENT OF HON. JOHN F. BALDWIN, JR., A REPRESENTATIVE IN CONGRESS FROM THE STATE OF CALIFORNIA

Representative BALDWIN. I just want to make an oral statement.

Senator ANDERSON. Go right ahead.

Representative BALDWIN. I am John F. Baldwin, Jr., Congressman from California.

Mr. Chairman, I had the opportunity to go through the Yampa River Gorge this past summer in a rubber boat and to study it in quite detail over a 5-day period. I am from northern California, I am not in the area of California which would be affected by the water use from this dam, and the testimony that I wanted to give is not comparable to those from southern California, but primarily on the conservation aspects of this plan.

I am a member of the number of conservation organizations in California which are interested nationally in conserving our natural resources in the present form where they have been set aside in national monuments or national parks.

The experience we had in going through the Yampa River Gorge last summer, I was one of several parties that totaled over 300 people, convinced me that this was one of the most beautiful natural gorges in the United States, and to convert it into a dam in the nature of the

one contemplated would take from the people of the United States one of the areas that is going to become nationally known very rapidly for its scenic beauty. I know there has been testimony presented that a dam in this canyon would not decrease the beauty, but would add to it. I do not believe that is at all the case because I am familiar with dams in other areas such as the Shasta Dam in northern California, and other dams, and I have never seen a dam yet that gave the impression of natural beauty that a natural river gorge does in its natural state.

Senator ANDERSON. I do not believe that is the claim. You said that the claim was that the construction of the dam might increase the beauty of the situation. They do not say that the dam will put it back to its natural state because anybody knows putting in water would not do that, but would it increase the beauty?

Representative BALDWIN. I think those who have observed the area and are familiar with it, feel pretty strongly, particularly among the conservation groups.

Senator ANDERSON. How long have you lived in California?

Representative BALDWIN. All my life. However, my experience is not limited to California.

Senator ANDERSON. Have you visited Boulder Dam, Hoover Dam, Lake Mead?

Representative BALDWIN. Yes; I have.

Senator ANDERSON. Did you visit before or after the dam was built?

Representative BALDWIN. Afterward.

Senator ANDERSON. Do you know how many people visited Lake Mead and that area before the dam was built?

Representative BALDWIN. I am not contrasting the number of people that might use it before and after. The point I want to make, Mr. Chairman, is this, that we are a rapidly growing country and as a result of that the number of areas that are retained in that natural state just as they are for people who want to get away from the civilized areas are becoming lesser and the purpose of the national park and national monument system was to preserve the areas in this natural form so that they can be enjoyed by people who like to get away at times during the year. You can find great areas in back of Sequoia National Park or the back of Kings Canyon National Park or the Yosemite National Park where a relatively few people get to them and enjoy them, but they are set aside by the National Park Service which means the Congress of the United States, because they have such a beauty that it is desired by the Congress and the National Park Service to preserve them for future generations.

There is a beauty in the present form of Yampa River Gorge that would not be there if the dam were built. There is not only that, but you have the matter of Indian caves and other things that would be changed by the building of a dam.

I do want to register a very strong feeling on this subject because the interest is nationwide. I am receiving letters from people in my district who are very much interested in national parks and national monuments and I know not only from my own experience, but from those of others that this is really a very rare and scenic gorge in its present form. Although it may be true what you say about Lake

Mead that there may be more people that might use it for a different form, those people can go to other lakes behind dams that now exist. But they cannot go to the river gorges like the Yampa River Gorge in its present form because there are few of those.

Senator MILLIKIN. Do you think they will go to the canyons in their natural forms?

Representative BALDWIN. I think there is a rapidly increasing use. For example, this summer, the day on which we went through, there was a group of 60 that went through that day, which I might say are many more than are on some of the back country trails in some of your existing national parks——

Senator ANDERSON. Would we not both concede, however, that until the controversy arose over Echo Park there was never more than a handful in any one year?

Representative BALDWIN. That may be true, sir, but I do not think we are going backward, I think we are going ahead and I think the future of this will show that there will be an increase in usage of this area for the enjoyment of the scenic beauty. There was a high-school group that went through the day before we went through that had come from hundreds of miles away and people from other places in the United States. I think that the evidence is that the use will increase year by year in its present form. I do not think you can compare mass numbers. It is true we might get more people in some of our national parks if we changed their form and made recreational things of a different type available, but that is not the purpose of the national parks. It is to preserve the parks in their present forms that there can be a means of enjoying them by people interested in doing so.

Senator MILLIKIN. Mr. Chairman, is the gentleman aware of the earlier history of this particular national monument where there is record evidence that it was intended someday that it would have a power development and have a dam there?

Representative BALDWIN. I have heard that particular point mentioned before, Senator, but the point I would like to make is this: I do not think that is necessarily the hinge upon which this decision should be made. It is mainly that it has been created as a national monument; that very recognition is a recognition of its beauty in its present form.

Senator MILLIKIN. But in creating it as such it was also understood that it would also be reserved for power purposes?

Representative BALDWIN. I believe it is disputed as to what was going to be reserved for power purposes. There are those who have the understanding that it would just apply to a very small development in Browns Park rather than the Echo Park at all. But the point I primarily wanted to make is that no matter what might have been in an earlier provision about which there is dispute, it seems to me that there should be given recognition to the fact that this is a very unique, remarkable canyon in its present form and that there are people in greatly increasing number over the years from all over the United States that do want to have an opportunity of retaining certain of the scenic areas in their present form and not have them changed in complete nature or different types, because we have fewer and fewer such natural scenic areas left.

Senator ANDERSON. I think it may be making it difficult for people who want to create national parks and monuments because Congress must look at a national monument or park and say, "You had better be careful because even if you make a reservation that a certain section will be cut out at the time you get to it there will be a group of people that will come and say, 'Violate your promise.'" I was one of those who sought to have the Carlsbad Caverns transferred to the National Government, not so they might remain in their natural form but so they might be seen by people. In the natural form we went down in a bucket and it was not much fun. Now we go down in an elevator. You would say that is no fun. Before that you carried a couple of boiled eggs in your pocket to eat; now there is a restaurant in Carlsbad Caverns. You would say that that is horrible. I have seen thousands of schoolchildren go through there day by day and I think it is serving a useful and proper function.

Representative BALDWIN. Mr. Chairman, if I may say, I think the putting in of an elevator and maybe the use of luncheon facilities is quite different than the construction of a huge dam.

Senator ANDERSON. It depends on whether you want to use water or food, to be sure. You are trying to insist that this gorge must remain in its natural shape. Carlsbad did not remain in its natural state. Three or four people could go through them in a year when the cowpunchers knew about them, a hundred went through after they became well known, and now thousands and hundreds of thousands go through in a year. It all depends on whether you want all the people to use them or just a few.

Representative BALDWIN. The point I wanted to make, sir, is that every national park has trails through it. For example, the Forest Service and the Park Service do construct trails. I am not objecting to access trails of that type; nor am I objecting to a means of access to the Carlsbad Caverns because it retains basically the same form as always. To provide a means of access, in my opinion, is quite different than to flood it. Here, if you would want to make a comparable comparison, you would have to compare flooding Carlsbad Caverns with Echo Park. The means of access is a different situation. I would not object to having a means of access for people to go in and enjoy the beauty, but it is something different from a dam which changes the nature completely.

Senator ANDERSON. The minute you were to have water in there it would give you a means of access to it. Some people think it would probably increase the number of people who would come there. It will no longer be a wilderness. If it is wanted that it remain a wilderness, that is a decision that will have to be reached. I have never been greatly concerned about Echo Park Dam, but there are honest people who are probably sincere advocates of conservation who still believe in it. I know that when they tried to destroy the Gila wilderness in my State there were not many people to help me in my fight.

I wonder why we get so agitated all of a sudden on some things? I never heard of Echo Park. They had a record of how many people visited heretofore. If a dozen people or 50 people were the highest that got in there in a single year up to the period of controversy, we can understand now how many are coming in during the controversy.

Once the controversy is over, you might expect it to go back to the 10, 20, or 50 people a year.

Representative BALDWIN. I do not think that would follow, Senator, because I believe that the Echo Park area and the Yampa River Gorge has become known to many, many people in the last few years and that knowledge has been conveyed to many others. For example, I was one of the people who heard about it through a friend who went through the area and I think that will continue to exist and grow. I do not think it will go back, I think it will continue to grow.

Senator ANDERSON. We had hoped to spend many thousands of dollars on the trail of Coronado up through the United States, some of it from private funds and a little of it in my own private fund. We found a spot for a Coronado national monument and recently they changed it. It was of interest during the time the Coronado celebrations were going on and then nobody paid any attention to it thereafter.

I wonder if the interest in this at the present time is not due to the interest in the controversy that has arisen and the desire to see what people are scrapping about rather than the choice beauty?

Representative BALDWIN. I think it has been stimulated, but I do feel very strongly, because of the nature of it, that now that it has become known to people that that knowledge will stimulate others to want to see it.

Senator ANDERSON. Thank you.

Senator MILLIKIN. How, in your opinion, would the beauty of the layout be impaired by putting in the water behind the dam?

Representative BALDWIN. We checked all along as we went through to determine approximately where the top of the lake would exist. In some areas, of course, it will be higher up in the canyon than others. But it completely destroys the present nature of the canyon. In some of the parts of the canyon at a low-lying level, there are Indian caves. There is a natural canyon form where a lake is going to make it quite different than that. It is going to have an ebb and flow, such as is true with Lake Mead, where there will be sections of it at low points that are just nothing but sand and a very uninteresting, very unpretty type of area that has just loose gravel and sediment, and so forth, which is the nature of every dam between its high point and low point.

Senator MILLIKIN. You have just made the point that the beauty would not be enhanced?

Representative BALDWIN. Very strongly. I think it would be to the contrary.

Senator MILLIKIN. Beauty is a matter of taste. Do you ascribe a lack of good faith and good taste to those who prefer a lake at the bottom of it?

Representative BALDWIN. No, the point I make is this, Mr. Senator, and that is we have many many other lakes in the United States. We have many other lakes behind dams. Those interested in that kind of use can go to very many places.

Senator ANDERSON. Cannot the people interested in canyons go to many other places?

Representative BALDWIN. Not to find a canyon of the exact nature of Yampa Canyon.

Senator ANDERSON. Exact is not the word. You said they could go to many other places for lakes, can they go to any one of those places to find an exact lake?

Representative BALDWIN. There is a difference, because people using lakes are using lakes primarily either for boating or fishing. Those are two of the main things. They can do those particular things in many other lakes and behind many other dams. The people who go into the canyon such as the Yampa River go to enjoy the particular beauty of that canyon and there is a difference.

Senator ANDERSON. They go because of the controversy. They never went there for the scenic beauty. They read about this thing and they want to know what is this thing they are squabbling about. Why do you not introduce figures showing how many people visited the canyon between 1910 and 1955?

Representative BALDWIN. The point I want to stress, Senator, is that we are not going backward, we are going forward. I think it is like Yosemite and the Yosemite has not decreased. It has grown steadily as people became aware of the area. I think that is the same with the Yampa River. Yosemite became known in the latter part of the 19th century and Yampa River is widely becoming known now. I think it will continue to grow steadily in interest as people become aware of its natural beauty.

Senator MILLIKIN. Mr. Chairman, I think the great lack that we have in our scenic beauty of the West is the lack of water in juxtaposition to the mountains that you can look at. I invite your attention to the history of Switzerland and the exploitation of its scenic beauty. One of the things that makes Switzerland so attractive is that you often find a lake in juxtaposition with the mountain. Most people find that beautiful. In any event, I want to say to you that we cannot eat mastodon bones; we have to eat more substantial fare than that.

Representative BALDWIN. The bones are not involved.

Senator MILLIKIN. I agree with that. All you are worried about is preserving a partially dry bottom of a canyon instead of putting some water over the top, which many people think is more beautiful than it would be in its natural state.

Representative BALDWIN. Those who have gone through it say it would preserve a tremendously beautiful natural canyon.

Senator MILLIKIN. And those who do not prefer that, have this particular taste, would prefer it otherwise.

Senator ANDERSON. I think the Snake River, you realize there are canyons after canyons after canyons.

Representative BALDWIN. I am familiar with the Snake River.

Senator ANDERSON. Why are you not satisfied to just keep those and let us have a little water?

Representative BALDWIN. I do not believe that we should do that when it is the matter of the Yampa River area. There are many of us who are not convinced that the availability of this water is impossible without the construction of the Echo Park Dam.

Senator ANDERSON. I think the whole Lake Mead country has been improved by the development of water resources out there. The point that Senator Millikin makes about Switzerland: I know if I go to see the Jungfrau I go to see it from Interlaken so I can see it across the very little lake at the bottom. I stay at the little hotel so you can

have a room and look across the lake and see Jung Frau. I do not try to find the rugged natural beauty. The creation of that little hotel does not disturb my artistic sense a bit which probably illustrates why I cannot be quite as disturbed about this.

Representative BALDWIN. You are looking across a different situation, you are not looking across a dam.

Senator ANDERSON. I think I would like to put in the record at this point the letter of the Secretary of the Interior of June 27, 1950, which is found on page 218 of the Colorado River storage project, in which Secretary Chapman deals with this matter. I do it only because Secretary McKay has dealt with it and I try to put the different Secretaries in to keep it on a nonpolitical basis.

(The letter referred to is as follows:)

Memorandum to: Commissioner, Bureau of Reclamation, Director, National Park Service, from the secretary.

Subject: Construction of dams in the Dinosaur National Monument.

The preparation of a comprehensive report for the development of the upper Colorado River Basin has posed the question of whether Echo Park (immediately) and Split Mountain (eventually) dams should be built in the canyon sections of Dinosaur National Monument. I will not have the final say, but I must determine whether, as Secretary of the Interior, I shall approve and recommend to the Congress a plan that includes these dams.

The history of the issue is well known to you and is well documented in the transcript of proceedings of the hearing I held on April 3, 1950. I shall not review it here.

I am impressed with the fact that the waters of the Colorado River constitute a resource of paramount importance to the region and that in view of the arid nature of the area, my approved plan for the development of the upper basin must make every practicable provision for the conservation and multiple use of these waters in the interest of the people of the West and of the whole Nation.

I am not unmindful of the public interest in the inviolability of our national parks, and in the status, only a little less austere, of the national monuments. By no precedent of mine would I wish to endanger these places.

Weighing all the evidence in thoughtful consideration, I am impelled in the interest of the greatest public good to approve the completion of the upper Colorado River Basin report, including the construction of the dams in question, because:

(a) I am convinced that the plan is the most economical of water in a desert river basin and, therefore, is in the highest public interest; and

(b) The order establishing the extension of the monument in the canyons in which the dams would be placed contemplated use of the monument for a water project, and my action, therefore, will not provide a precedent dangerous to other reserved areas.

I note that the fossils are not in the areas of the monument proposed to be flooded and that the creation of the lakes will aid the public in gaining access to scenic sections of the Green and Yampa River Canyons. Much superb wilderness within the monument will not be affected, excepting through increased accessibility.

The importance to the growth and development of the West of a sound upper Colorado River Basin program can scarcely be overemphasized. I hope that this decision on my part will promote quick solution of all other problems connected with this matter so that we may proceed with such a program.

I ask the National Park Service and the Bureau of Reclamation to cooperate fully in making plans that will insure the most appropriate recreational use of the Dinosaur National Monument, under the circumstances.

(Signed) OSCAR L. CHAPMAN,
Secretary of the Interior.

Thank you, Mr. Baldwin.

Representative BALDWIN. Thank you, gentlemen.

Senator ANDERSON. Mr. David R. Brower

59762—55——41

STATEMENT OF DAVID R. BROWER, EXECUTIVE DIRECTOR, SIERRA CLUB

Mr. BROWER. My name is David R. Brower of Berkeley, Calif.

Thank you for this opportunity to appear before you. I speak in behalf of the Sierra Club, a national conservation organization of 9,000 members in all but one or two States, established in 1892 in San Francisco. I also speak in behalf of the Federation of Western Outdoor Clubs, a regional conservation organization whose 31 federated clubs have 22,000 members in Washington, Oregon, California, and Utah.

In last year's hearings before the Senate and the House I described the kind of organization the Sierra Club was, and there has been no change except that we are about a thousand members larger and have a new chapter in the Pacific Northwest. Our membership, drawn from many walks of life, provides a wide variety of top professional skills represented in the club's officers and directors and advisors. Our membership is deeply interested in conservation of the country's natural resources, with special emphasis on parks, wilderness, and wildlife. All the clubs of the Federation have programs for getting people out of doors where they can see for themselves the great value to our culture of leaving some of the best samples of the natural world just as God made them.

In their conservation programs these clubs have done their best to enlist the support of the people and their Government in preserving the National Park System. We are delighted in the progress this Nation has made, through the wisdom and the protection afforded by the Congress, in seeing to it that development of our resources and improvement of our national park system go hand in hand.

Throughout the storm of the Dinosaur controversy last year we were pleased to note that no one claimed that our park system should go by the board. The President wanted to protect and improve it. The Department of the Interior was reluctant to have to decide, it thought, in favor of damming Dinosaur. The strongest advocates endeavored to build up a case to show that Dinosaur Dam wouldn't lead to dams elsewhere in the park system. Many people, with varying degrees of sadness, concluded that at times there had to be a choice between parks and progress, and they really thought, I believe, that this was one of those times. Evaporation loss, loss of enough irreplaceable water, they said, to supply a city the size of Denver—this was the fundamental issue.

This year the President has said that continued vigilance will be maintained over our national parks. He has urged "the Congress to approve the development of the upper Colorado River Basin to conserve and assure better use of precious water essential to the future of the West."

I do not know of a single conservation organization which takes exception to either of the President's expressed wishes. The general feeling of these organizations across the country, and this includes the Sierra club, is that they are sincerely interested in the sound development of the share of the Colorado River system water allocated to the States of the Colorado River Basin, provided the development does not impair the national park, wilderness, and wildlife preserves.

Although evaporation was called the fundamental issue last year, we don't hear much about it now in Interior Department testimony. Where last year there was reluctance to dam Dinosaur on the part of the Department, this year the Bureau of Reclamation claims that a dam will enhance Dinosaur. Where last year Secretary McKay said the Brown's Park withdrawal was no license for a dam at Echo Park, this year the Bureau clearly implies that it is. And while the President would maintain continued vigilance over our national parks, the Bureau of Reclamation announces, "We cannot afford to padlock our remaining natural heritage."

We're not sure that evaporation ever was a fundamental issue. We know that no dam in the monument will enhance Dinosaur. The 1938 proclamation enlarging Dinosaur protects Echo Park, and even if it didn't, we should. And no one wants to padlock our heritage, but we do want to save the best of our scenic heritage from, and not for, the Bureau of Reclamation.

One of these days, we can hope, it will be enough merely to want to save these places, and they will be saved. That, I guess, will be the millennium. Meanwhile, we must argue and show cause—and, in the case of the present controversy over the Colorado River storage project and its relation to Echo Park Dam, we must help seek out alternative solutions. This we have earnestly tried to do, and we think great national gains can come from this effort.

It occurred to some of our people long ago that the real wheelhorse of the Bureau of Reclamation's project—Glen Canyon Dam—would have to be scrutinized closely to see what major alternatives there were for dams in Dinosaur. The scrutiny has been rewarding, and I'd like to summarize it here. The Colorado River project is so complex, and so many millions of words have been written and spoken about it, that it can serve good purpose to follow one element through the years—especially a key element—to see how it evolved.

In compiling for you this review of some of the highlights of Glen Canyon Dam's role, together with its relation to Rainbow Bridge National Monument, I know that no perfect solution is to be found in this world. We have to settle for adequate solutions and go ahead as best we can. So I give you these excerpts from Glen Canyon's history and ask this question in advance. Is the Glen Canyon solution good enough?

GLEN CANYON: GEOLOGICAL DIFFICULTIES AND RAINBOW BRIDGE

Thirty years ago

Quite a stir was created in Pasadena about 30 years ago when a piece of rock, presumably from a Glen Canyon site, was placed in water in front of an assembly of civil engineers. It crumbled in water. Harsh words passed back and forth.

Excerpts from writings back then were not harsh words, but objective words, worth noting.

The first item is from hearings before the House Committee on Irrigation, 68th Congress, 1st session, on H. R. 2903—hearings held in 1924. On page 721 Mr. F. E. Weymouth, chief engineer of the Reclamation Service, wrote:

> One is the dam site at Glen Canyon is much larger, that is, much wider; therefore, requiring much more concrete in the dam. Another reason is the

foundation conditions there are very different than in Black Canyon. It is very soft sandstone in Glen Canyon, in fact, it is as soft as a very soft brick, and our consulting engineers advised in that particular case that they would not recommend foundation pressures of more than 20 tons per square foot; but this estimate I just gave you of the $126,500,000, was for a dam of 30 tons pressure. And our engineers would not recommend a dam there with that pressure.

Mr. Weymouth had some further interesting remarks on Glen Canyon dam sites in his report on the Colorado River, volume 6, Glen Canyon Investigations, Plans and Estimates, February 1924—in the Bureau's Washington office engineering files.

Senator ANDERSON. I am having difficulty with the earlier quotation. What does this relate to, this $126,500,000?

Mr. BROWER. This is a discussion of the Glen Canyon dam site, which was one of the sites being considered at the time they were also considering the Hoover Dam site.

Senator ANDERSON. They decided that the Hoover site was better than the Glen Canyon site?

Mr. BROWER. Yes.

Senator ANDERSON. That is all it does?

Mr. BROWER. That is all it does there. This is just showing that there were some questions back there which I will bring up to date.

Senator ANDERSON. In other words, they thought that if it was to be the main dam it was not quite suitable?

Mr. BROWER. Well, I would say that this first paragraph relates only to a difference in the load on the bearing service in tons per square foot; that they wanted to spread the load out more because of some question about its ability to stand the more concentrated load.

Now, to go back to Mr. Weymouth:

The rock at both sites is described as Jurassic sandstone, very massive in structure, having few joints and relatively few bedding planes. The sand grains are quartz, imperfectly rounded but without sharp edges; somewhat loosely cemented with calcium carbonate; 90 percent of the rock is made up of grains from 0.15 to 0.25 millimeters in diameter.

The rock resembles in hardness the type of soft brick known in the trade as Salmon brick. It crumbles under shock, such as that of ordinary blasting, and small fragments can be crushed to sand between the fingers. Notwithstanding its softness the rock stands remarkably well in the canyon walls, forming large smooth cliffs that rise 1,000 feet or more above the river at very steep angles. * * *

In regard to the suitability of the Jurassic sandstone as abutments for an exceedingly high dam a statement of Mr. Bryan's should not be overlooked. In speaking of tunnels through the rock he says on page 1623 of Proceedings September 1922: "However, unless the velocities in the tunnel are low, a concrete lining will be necessary to prevent wear. It seems likely also that there will be losses to the adjacent porous sandstone if the water in the tunnel is under great pressure and that this water percolating through the standstone may eventually find or work out channels large enough to produce serious losses from the tunnel and direct the water toward inconvenient places."

Senator ANDERSON. You recognize that if I suggested a Grand Canyon dam it could be anywhere within the Grand Canyon?

Mr. BROWER. Yes, sir.

Senator ANDERSON. If I suggested a Grand Canyon dam it could be anywhere along Grand Canyon. What is being said here has no relevance whatever and not even a slight relationship to the present dam.

Mr. BROWER. Sir, there is this relationship——

Senator ANDERSON. It is 10 miles away from it and it does not have the same formation.

Mr. BROWER. It is still Jurassic sandstone, as will be brought out later in further excerpts, if the Bureau's figures are correct.

In another place he states that the cementing material of the standstone is calcium carbonate. What is true of pressure tunnels would be true of the reservoir itself. It is possible that by reason of the solubility of the calcium carbonate any crevice in the rock might become enlarged and in time produce the channels referred to in connection with pressure tunnels. If these channels would develop in the the abutments of the dam or in its foundation serious results would follow.

1947

In House Document 419 (the Colorado River) the Bureau of Reclamation says:

An alternative plan would place a higher dam at the Glen Canyon site to raise the water 605 feet above the present stream bed (725 feet above the proposed foundation). This would create a reservoir of 34 million acre-feet capacity (larger than Lake Mead, 32,360,000 capacity) of which 29 million acre-feet would be active capacity. In addition to having value for flood control and silt retention, the reservoir would have tremendous hold over capacity to assist the upper basin * * *.

I asked Mr. Jacobson, of the Bureau, about this in the course of the House hearings last year. "That was a preliminary report that didn't mean anything," he replied.

1950

In its 1950 basic report, the Bureau of Reclamation states, concerning the Glen Canyon site:

The Glen Canyon site is geologically favorable for a high concrete dam. At the site the sides of the canyon rise abruptly from the river bed in nearly vertical walls 650 feet high (770 above the proposed foundation). The rock forming the abutments and the foundation is the massive Navaho sandstone of Jurassic age. This massive formation is a medium grained sandstone, buff to red in color. The rock is remarkably free of structural defects. No folds are found in the dam site area, and the massive sandstone lies in a nearly horizontal position except for a slight dip upstream into the left abutment.

Twenty-eight holes have been drilled at the Glen Canyon site. The rock conditions were shown by the exploratory work to be generally satisfactory.

A 700-foot dam was proposed.

January 1954

At the time of the hearings before the House Subcommittee on Irrigation, the Bureau expressed no doubt about the geology of the Glen Canyon site. Comments in opposition to the proposed high Glen Canyon Dam (735 feet) were directed to an alleged peril to Rainbow Bridge National Monument, to increased evaporation loss (Under Secretary Tudor then claimed 165,000 acre-feet per year), concentration of storage low in the basin, loss of some power, and loss of river regulation.

April 1954

The Bureau was still not concerned with geology. Mr. Dominy of the Bureau wrote a letter on April 16 revealing new evaporation errors in which he stated that the cost of protecting Rainbow Bridge was known to be extremely high but that he did not know what the cost would be. On April 30, Mr. Tudor thought a high Glen Dam "would either flood out the Rainbow Arch National Monument or re-

quire the construction of a substantial dam to protect it," and the additional water, he felt, would be stored too far downstream.

May 1954

There was still no concern about the geology. On May 7, Mr. Dominy informed Congressman John Saylor:

> The regional office has not performed engineering that would be necessary to submit a defensible estimate on the high Glen Canyon Dam and could not come within any reasonable estimate at all without expenditure of considerable funds.

Confronted with this lack of information from the Bureau, the Sierra Club obtained a rough engineering estimate of the cost of a higher Glen Canyon Dam, which it was found would be of the order of an additional $25 million. This additional cost, however, would far more than be offset because High Glen would preclude the construction of Echo Park and Split Mountain Dams and the expenditure of most of the $21 million advocated for "recreational improvement" of a severely impaired Dinosaur National Monument. The resulting total saving in cost would probably be in the neighborhood of $200 million.

Later in May, upon being ordered to recalculate evaporation losses for the entire project owing to errors which the Sierra Club had disclosed, the Bureau of Reclamation marshaled other reasons for opposing High Glen Canyon Dam, briefly as follows:

1. Although Mr. Tudor had agreed that the Rainbow Bridge argument was not valid, John Marr, of the Department staff, continued to quote that argument, and regional reclamation director E. O. Larson alluded to it in his testimony before the Senate Subcommittee on Irrigation in June.

This was done in spite of the statement in the Interior Department's fact sheet of January 19, presented to the House committee, which says, concerning the 700-foot dam proposed at Glen Canyon by the Bureau:

> The San Juan River arm at high water would encroach to some degree upon the Rainbow Arch National Monument. Damage to the monument will be avoided by the construction of a dike across the draw below the monument boundary to avoid any inundation of the national monument lands.

There was no indication, when the high Glen alternative was discussed in January, that 35 feet could not be added to the cutoff dam.

2. There would be some loss of installed power but the Department admitted that this could be made up from other sources. It is pointed out later in this statement, moreover, that this power deficit could be made up at a saving in cost by using upper-basin coal reserves and thus further benefiting upper-basin economy.

3. Concern was expressed about concentration of storage low in the upper basin. Inasmuch as the Echo Park and Split Mountain and Glen Canyon storage is solely for power and for river regulation, and not for irrigation or diversion, this argument is without validity, or at best overlaps the power argument. Maximum regulation of the river's flow to the lower basin could be obtained below the confluence of all major upper-basin streams, and the Glen Canyon site would accomplish this.

4. The argument concerning river regulation is again an overlapping argument and apparently neglects to consider that the streams which would be regulated by Echo Park and Split Mountain Dams,

namely, the Green and Yampa Rivers, will be regulated by Flaming Gorge and Cross Mountain Dams when these are built. The only large tributary to the Green via the Yampa left unregulated would be the Little Snake River, which, in turn, would be regulated eventually by a participating project planned for it. Further regulation would exist at the Gray Canyon site between Dinosaur National Monument and Glen Canyon. No significant flood-control credit is involved in the Colorado storage project.

June 1954

At this time Reclamation Commissioner Dexheimer advanced a new argument, according to the story in the Denver Post of June 25, 1954, quoted below:

The evaporation error is immaterial—

Dexheimer said:

We will build our dams as high as they can be built feasibly, and under no circumstances can a higher Glen Canyon be considered as an alternative to the Echo Park Dam.

I will interpolate there that Mr. Tudor said this dam "would be an alternate to the construction of Echo Park." That was in the House hearings, page 21. So they completely disagreed.

Senator ANDERSON. Do you not think to be fair, that you ought to say that Mr. Tudor said that if a higher dam were to be constructed it would be an alternate?

Mr. BROWER. He proposed the dam, sir, as one of the alternates. I do not know where the initial point came. If it were under no circumstances an alternate, I do not think he would have proposed it or discussed it.

Senator ANDERSON. You mean you do not think when engineers start out to survey a country they look at the best location and all the other possible locations for a dam? They just pick one and stay with it against all other alternatives?

Mr. BROWER. That is a question that would be difficult to answer.

Senator ANDERSON. Not difficult to anyone who knows the West.

Mr. BROWER. Certainly they have looked up and down that river and the various charts that I have seen in the House hearings and the various reports indicate, and the profiles of the river, what sites they have considered.

(Continuing the Denver Post story:)

The greater evaporation loss from the higher dam was not the reason we proposed the lower one. The reason is geological. Our proposed dam 580 feet high is the maximum (700 above the foundation) that can be built on that site geologically. Evaporation has nothing to do with it.

Three days later (June 28, 1954) regional reclamation director E. O. Larson told the Senate subcommittee, concerning the higher glen:

Regardless of differences or arguments on evaporation, the Glen Canyon Dam should be constructed to the maximum height consistent with economy, safety of the structure, and adequate protection of the Rainbow Natural Bridge. From our preliminary studies, a dam rising 580 feet above the river creating a reservoir of approximately 26 million acre-feet would meet these criteria. Final detailed engineering studies for the safe height of the dam may result in a capacity of slightly more or even less than 26 million acre-feet. If the capacity is less than the 26 million acre-feet additional capacity must be sought elsewhere. If it is

more than 26 million acre-feet such increase should be used to compensate for the lowering of the Curecanti Dam and possible changes resulting from final surveys at other sites, to replace capacity of the less attractive upstream sites, or to lengthen the silt-retention period beyond 200 years.

Anything, it would seem—to be wistful—but to save Dinosaur.

In spite of having ordered a recalculation of evaporation, Under Secretary Tudor still leaned heavily upon the water-loss argument in his testimony before the Senate subcommittee in late June. This is in face of the fact that the recalculation had apparently not yet come in. Replying to my letters of June 1 and 4, in which various other sources of error, as yet unadmitted, were pointed out to the Under Secretary, Mr. Tudor wrote me:

I appreciate the specific points you called to my attention relative to possible errors in statements made by the Commissioner and employees of the Bureau of Reclamation. These will be promptly checked. As I have heretofore stated, I have been very disturbed over the error in my testimony before the House committee. While I can fully understand that a mathematical error can and often does happen, it is difficult to understand why this information did not come to my attention until so late. The Department is investigating this to ascertain the exact cause and thereafter take appropriate action.

Senator ANDERSON. Are you going to comment any more about Mr. Tudor's testimony in late June before the committee, because when you were half through here you talked about what had been said by the Denver Post and said that Mr. Dexheimer said:

Under no circumstances can a higher Glen Canyon be considered as an alternative to the Echo Park Dam.

You said he was in opposition to Mr. Tudor. Mr. Tudor says:

However, as pointed out before the committee, a high Glen Canyon Dam is not an acceptable alternate.

Mr. BROWER. That is not his wording before the House committee, the House committee hearings, page 21.

Senator ANDERSON. This is June 1954 and this June is 1954 and you thought the two were in opposition. I am quoting what Mr. Dexheimer said and what Mr. Tudor said. Mr. Dexheimer said:

Under no circumstances can a higher Glen Canyon be considered as an alternative to the Echo Park Dam.

Mr. Tudor said:

However, as pointed out in testimony before the House committee, a high Glen Canyon Dam is not an acceptable alternate.

What is the difference in those two statements?

Mr. BROWER. Let me say this, there was a period between January and June in which case Mr. Tudor could have obtained new information and changed his mind. At the time he suggested this alternate to the House and discussed it, he said it would be an alternate to the construction of Echo Park. If he changed his mind later and new information came in, that is something I would not know.

Senator ANDERSON. You were present at those hearings?

Mr. BROWER. I was present.

Senator ANDERSON. You would have known when he said it.

Mr. BROWER. I was present at this hearing.

Senator ANDERSON. Exactly. You were present at this hearing. I saw you every day.

Mr. BROWER. On June 24, I do not think I was there when Mr. Tudor spoke. The June 24 clipping of the Denver Post did not reach me until after that time.

Senator ANDERSON. I think it is unfortunate to say these men were at cross-purposes when one is making the statement one day and the other is making the statement the next day and they are absolutely on all fours.

Senator MILLIKIN. What do you have to say about that?

Mr. BROWER. I think, Senator Millikin, my explanation is that as I have given it to the chairman. Time elapsed. There is adequate time for a change of figures.

Senator MILLIKIN. The two statements were made roughly at the same time.

Senator ANDERSON. One day apart.

Senator MILLIKIN. One day apart.

Mr. BROWER. Those two statements are in reasonable consonance, but I would like to point out, all I am trying to do here is point out, what is happening here year by year and month by month and that there was a change of opinion between January and June about the feasibility of this as an alternate.

Senator MILLIKIN. Supposing there was, what is the importance of it?

Mr. BROWER. It is just that it all bears out the final conclusion I come to of how this whole thing changes.

Senator ANDERSON. I think that these things all do change.

Mr. BROWER. I am sure they do.

Senator ANDERSON. You are referring to a report on the Glen Canyon Dam to try to show that they subsequently changed their opinion on the Glen Canyon Dam. They went 10 miles away and found something more worth while. That is like saying to a man who says he does not believe there is any oil around Yuba City and subsequently a man comes in with oil at Yuba City, and you say that the man is silly, he examined this piece of land and they found oil 10 miles away from Yuba City.

Mr. BROWER. I should make it clear that I am not editorializing on these things. I am trying to point out the changes made through the years.

Senator MILLIKIN. What is your point?

Senator ANDERSON. To discredit public officials, and I do not think it is fair.

Senator MILLIKIN. I suspect that, but I would like to have the witness tell us.

Mr. BROWER. My point is that there are still some uncertainties here and I would like to bring it up to date, and then go from that point because I think it has a bearing on what I have to say.

Senator MILLIKIN. We will have to listen to the whole thing.

Mr. BROWER. Please bear in mind I said there is no perfect solution and we have to look for the best solution we can. I am just putting all these things in order on the calendar, some things that I have found, for your information.

Senator MILLIKIN. Has the Sierra Club built any dams?

Mr. BROWER. The Sierra Club does not have the function of building dams, but we have a good many engineers in the organization, some of whom are very expert at building dams.

Senator MILLIKIN. Do you know any organization that has built more dams, more successful dams, than the Bureau of Reclamation?

Mr. BROWER. I do not know what the tally would be between the Bureau and the Corps of Engineers, but they build a great many.

Senator MILLIKIN. They are a fairly experienced organization, are they not?

Mr. BROWER. They have a great deal of experience in building dams.

Senator MILLIKIN. And they must have quite an assemblage of expert talent to help them?

Mr. BROWER. They do, sir, and similarly, they had a good many experts on the subject of evaporation, where through our searching through their figures we found some rather serious errors that they had not found.

Senator MILLIKIN. Well, I am not saying that some errors could not be found in history, but if you are looking for someone to protect the United States as a Federal agency, who would you find is a more experienced outfit than the Bureau of Reclamation?

Mr. BROWER. I am not prepared to comment on that except that I think there would be some outside checking agencies included in the other bureaus of Government who could, by working over these plans, reinforce each other and find errors that no engineer sitting around this table would find, or that no engineer sitting in outside organizations would find.

Senator MILLIKIN. Then you get into an endless process of checking and rechecking with the result that nothing is finally accomplished.

Mr. BROWER. I appreciate, sir, that the perfect solution is a difficult thing to find, but we should strive for it.

Thus, in the attempt to make a case for what the Bureau once called the fundamental issue—greater evaporation losses if alternatives to Echo Park Dam were used—the Bureau had: (1) Made an error in subtraction, (2) miscalculated the height of one of the alternate dams; (3) erroneously calculated the area of one of the reservoirs, denied the error, then admitted it; (4) released a table of evaporation rates which does not reconcile with evaporation figures used; (5) issued a press release extolling its skill in determining evaporation rates, rates which it was not itself using; (6) compiled a strange table of operating levels for reservoirs contradicted by its own basic report, including 1 operating level 95 feet higher than the dam creating the reservoir.

The Bureau was ordered to recalculate its evaporation figures but continued to support its project before the results of any recalculation were made known.

The Bureau attempted to create the impression that the high Glen Canyon Dam alternative would threaten Rainbow Bridge National Monument, in the face of the Department's knowledge that its own proposal, a low Glen Canyon Dam, would threaten Rainbow Bridge unless protective measures were taken—measures which would likewise apply to high Glen.

Senator WATKINS. May I ask a question at that point?

Senator ANDERSON. Surely.

Senator WATKINS. Mr. Brower, you favor using of Glen Canyon as an alternate, do you not? You are recommending that, and that is what you are recommending?

Mr. BROWER. I have not recommended High Glen as an alternate. We took the figures the Bureau had prepared and Mr. Tudor had testified with respect to on this alternate, scrutinized them, and turned up the errors of which you may know. The Sierra Club's position, I think, is in accord with the other conservation organizations. We would not have any objection to a Glen Canyon Dam, low or high, that was part of a sound project that did not threaten Rainbow Bridge National Monument.

Senator WATKINS. Just a moment. You are affiliated with the National Parks Association, your organization?

Mr. BROWER. We are affiliated with the National Parks Association through being one of its cooperating organizations and also through the Natural Resources Council of America.

Senator WATKINS. I ask if you are acquainted with Mr. Fred M. Packard, executive secretary of the National Parks Association?

Mr. BROWER. Yes, sir.

Senator WATKINS. You people have taken, of course, the position that you are against any invasion of a national park or monument; is that right?

Mr. BROWER. That is our general position.

Senator WATKINS. Let me read you a part of a statement by Mr. Fred M. Packard, executive secretary, National Parks Association, which appeared in the Washington Post December 19, 1954.

Mr. BROWER. What was the date of that, sir?

Senator WATKINS. December 19, 1954. It appears that Mr. Packard was replying to a letter written by a Mr. Ryan. I am going to read these quotes and ask you if that is not completely contrary to the position you are now taking with respect to Grand Canyon.

Mr. Ryan's statement that Echo Park Dam would not set a precedent and that no one knows of any other dams proposed to be built within the national park system reveals surprising ignorance of the facts. To settle this point, it is well to name actively proposed projects and the parks they would impair. Some of these proposals have been before Congress for years; others are in the advanced planning stage. None have yet been built. They are: (1) Glacier View Dam, the Belly River project, and the Waterton Lake division project, in Glacier National Park; (2) Yellowstone Lake Dam in Yellowstone National Park; (3) Bridge Canyon Dam and the Kanab Tunnel, drastically affecting Grand Canyon National Park and Grand Canyon National Monument; (4) Cedar Grove, Tehipite, Sentinal, Paradise Valley, Simpson Meadow, and other dams affecting Kings Canyon National Parks; (5) Mining City Dam, flooding Mammoth Cave National Park; (6) the Wawona project in Yosemite National Park; (7) Glen Canyon Dam, affecting Rainbow Bridge National Monument; (8) Echo Park and Split Mountain Dams, in Dinosaur National Monument.

They are all named together as an invasion of national monuments. This is from the executive secretary of the National Parks Association. You have taken the position which you would favor if we have to have an alternate using Glen Canyon?

Mr. BROWER. Providing it is sound and does not invade the monument. And Secretary McKay has written that any necessary steps will be taken to protect Rainbow Bridge from Glen Canyon Dam.

Senator WATKINS. This gentleman points it out as one of those and you stand on the firm principle that it will be invading national parks and monuments and he names Glen Canyon as one that will be invaded and is against it as a matter of principle as well. When you are talking about Echo, the next one you knock out would be Glen Canyon?

Mr. BROWER. Not necessarily; that is something I will discuss a little later here, but I do not think that follows.

Senator WATKINS. I want to read the next paragraph from the article.

> Once any of these projects is built, the floodgates will be open and these national parks and monuments converted to unsightly reservoirs.

That includes Glen Canyon.

> The precedent is real, dangerous, and must be prevented.

He is saying that about Glen Canyon.

Mr. BROWER. The Department of the Interior has been of two minds on this. The fact sheet has said way back in 1947, the first indications were that it could be protected from Glen Canyon and the fact sheet of last January before the House said it would be protected. Then Mr. Tudor said that the high Glen Canyon Dam would add seriously to the difficulty of protecting the Rainbow. Other Bureau people were saying that Rainbow would be flooded by the high Glen. It will be flooded by either high Glen or low Glen unless they can build this cutoff dam they have been talking about. I do not believe they yet know how feasible that is, but that is a question I think pertaining to Glen Canyon in that long list.

Senator WATKINS. He does not make any ifs or ands; he comes right out flatly and says it will be an invasion of the national parks and it is a dangerous precedent.

Mr. BROWER. It may be.

Senator WATKINS. You are talking about inconsistencies among the proponents of these projects; I want to call your attention to the fact that there are inconsistencies, and grave ones, among you people. You oppose Glen Canyon and Echo Park and then you say you are for all the rest of it.

Mr. BROWER. The rest of my testimony——

Senator WATKINS. Does not mean much when you say that.

Mr. BROWER. I do not think I will be in opposition when I finish.

Mr. PACKARD. Could I speak for just a moment, Mr. Chairman?

Senator ANDERSON. Yes.

STATEMENT OF FRED M. PACKARD, EXECUTIVE SECRETARY, NATIONAL PARKS ASSOCIATION

Mr. PACKARD. I am Fred M. Packard, executive secretary of the National Parks Association.

What Mr. Brower has said is true all the way through. I just wanted to state that the National Park Service and the Bureau of Reclamation have now concluded an agreement in which they have agreed that the Rainbow Bridge will be protected against the effects of the Glen Canyon Reservoir if it is feasible to do so by two different methods. Both of them involve this check dam Mr. Brower spoke of. Subject to the carrying out of that agreement anything I said in my letter about Glen Canyon being an invasion of the national parks system would no longer be valid, and therefore would have to be stricken from the list. The other dams listed are correct.

Senator WATKINS. You had this information at the time you wrote this letter?

Mr. PACKARD. No, sir. The agreement was drawn about 2 weeks ago. I had a copy of it. I do not know whether you have a copy of it.

Senator WATKINS. Do you believe in respecting agreements with respect to these national parks and monuments?

Mr. PACKARD. I am getting to the other question.

Senator WATKINS. Do you?

Mr. PACKARD. Certainly.

Senator ANDERSON. Go ahead, Mr. Brower.

STATEMENT OF DAVID R. BROWER, EXECUTIVE DIRECTOR, SIERRA CLUB—Resumed

Mr. BROWER. These arguments collapsed. The Bureau then advanced geological reasons for not building high Glen. But, the Bureau itself suggested a high Glen Canyon dam (725 feet high) in 1947. That 725 feet assumes 120 feet of excavation from the river channel to bedrock. Its basic report, in 1950, showed that a dam 770 feet above the foundation was geologically possible.

Senator ANDERSON. Would you refer to the documents and show where that is?

Mr. BROWER. In House Document 419.

Senator ANDERSON. I will be glad to hand it to you. You are not quoting from this. You say, "Its basic report in 1950."

Mr. BROWER. Oh, yes; that will be found in the study of the geological sites.

Senator ANDERSON. Do you want to find here where they recommended a 725-foot dam?

Mr. BROWER. 128 and 129, I believe. I can supply this citation and the quote. Do you want this right now?

Senator ANDERSON. I surely do; that is why we asked for these statements a day in advance, because when you get into things of this nature we ought to have a chance to check them. You are trying to indict the Bureau for dishonesty, and that is always a dangerous process and sometimes kicks back.

Mr. BROWER. I am trying to report as objectively as I can editorializing later on what is happening on this one site.

Senator ANDERSON. If you want to, supply it later.

Mr. BROWER. I can supply it later.

(The information was not supplied at the time the hearings were printed.)

Senator ANDERSON. Because I am ready to question you on this one here. The basic report of 1950 shows a dam 770 feet above the stream bed was geologically possible. I would be glad to give you all the rest of the day to find it.

Mr. BROWER. That will be in the geological report.

Senator ANDERSON. Yes; you try to find it.

Mr. BROWER. Yes, sir.

Senator ANDERSON. We asked for some figures and this gentleman promised to read them into the record. You may proceed.

ADDITIONAL STATEMENT OF JAMES H. HOWARD, GENERAL COUNSEL, METROPOLITAN WATER DISTRICT

Mr. HOWARD. Mr. Chairman, I am James H. Howard. When I was on the stand a few days ago, Senator Goldwater asked me for some information respecting the Metropolitan Water District bonds. I think the following figures will satisfy his request. These figures are February 28, 1955. The authorized bond issue of the Metropolitan Water District was $220 million. Of that amount there have been sold $204,684,000. To date there have been redeemed $26,280,000. The interest paid on the outstanding bonds to date is $135,013,170.25. There are some bonds outstanding which are due, but have not been presented for payment aggregating $46,000. There are also some interest coupons due but not presented for payment, $194,687.50.

I think that covers the information called for by Senator Goldwater.

Senator ANDERSON. Thank you.

Mr. HOWARD. Thank you, gentlemen.

STATEMENT OF DAVID R. BROWER, EXECUTIVE DIRECTOR, SIERRA CLUB—Resumed

Mr. BROWER. Page 118, House Document 364.

Senator ANDERSON. You read where they said there will be a high dam 770 feet.

Mr. BROWER. I cannot read where it says that.

Senator ANDERSON. That is exactly what I am trying to contend. The walls of the canyon rise up, but if you will kindly take a look at the pictures they have made of Echo Park Dam they had a working model of it with the dam down low and the walls of the canyon rising 1,700 feet above that. Therefore, would it be your contention that they proposed a dam 2,000 feet high?

Mr. BROWER. No, sir.

Senator ANDERSON. Where does this say anything about 770 feet?

Mr. BROWER. The walls of the canyon, 650 feet which, if you add to that the excavation of 120, totals 770 feet.

Senator ANDERSON. Precisely; but I am saying, Have you ever looked at the Hoover Dam?

Mr. BROWER. Yes, sir.

Senator ANDERSON. Do the walls rise above the top of the dam?

Mr. BROWER. They do, sir.

Senator ANDERSON. Therefore, is the Hoover Dam, the amount of the excavation plus the amount of dam plus the amount of the walls above it?

Mr. BROWER. May I amend my sentence to say instead of "showed," "indicated"?

Senator ANDERSON. I would just as vigorously question "indicated." It has nothing to do with the size of the dam. The walls of the canyon, I am not an engineer—I have been speaking about law very freely because I am not a lawyer, but now I speak very freely about engineering, because I am not an engineer. I do not think a man has to have an engineering degree to know that, but if the Bureau of Reclamation is placing a dam in the bottom of the canyon and desires

to take away 120 feet for foundations, and then build a 400-foot dam, that because the walls rise higher above that the dam is the total of the foundations plus the concrete, plus the rock walls, and you do not think that either?

Mr. BROWER. No; I do not.

Senator ANDERSON. Why did he say that?

Mr. BROWER. What I do say, and what I think I can stand on as a layman——

Senator ANDERSON. This is not a question of a layman, this is a question of whether you are bearing true witness or not.

Mr. BROWER. All right, then. My point is this: The height decided upon finally is going to depend on a great many factors. One of those factors will be the height that they want to build it. Mr. Dexheimer says—Mr. Larson testifies that it might go higher or lower than 700 feet. They will know when they excavate further. At the proposed Feather Dam in California they have gone beyond the walls. I do not suggest that the engineers, if they want to go to the top of high walls, the precipitous walls, cannot do it with essentially the same technique they have now.

Senator ANDERSON. That is your engineering testimony on what you might do if you were building a dam. You said:

> Its basic report in 1950 showed that a dam 770 feet above the stream bed was geologically possible.

I have asked you to find that.

Mr. BROWER. The dam is geologically possible.

Senator ANDERSON. Go ahead now.

Mr. BROWER. I would say as the next relevant statement that I would not concede that the next statement was a non sequitur. The next statement said, "The sides of the canyon rise."

Senator ANDERSON. That is the only statement you used that I understood.

Senator Anderson said something like: "That is the only Latin phrase I understand."

Mr. BROWER. It is geologically favorable because it has walls 660 feet high.

Senator ANDERSON. The canyon has walls, what about the storage dam? Where does this mention the storage dam? Where does it say that a storage dam of 770 feet was geologically possible; that is what I want to know.

Mr. BROWER. It shows that by saying that it is geologically favorable for a high concrete dam.

Senator ANDERSON. Do not switch words on it again. Read it again, the first sentence.

Mr. BROWER (reading):

> The Glen Canyon site is geologically favorable for a high concrete dam. At the site the sides of the canyon rise abruptly from the river bed in near vertical walls 650 feet high.

That, I contend in my own lay way, makes my case.

Senator ANDERSON. That is fine. If all your testimony is of that character, then we must regard it as lay testimony pretty broadly because I think you cannot find much here.

Mr. BROWER. May I suggest that that bears out my statement in my testimony which says, "Its basic report, in 1950, showed that a dam 770

feet above the foundation was geologically possible." I put a period there because I do not know whether it is engineeringly possible. We are talking now about geology.

Senator ANDERSON. Wait a moment, it is not engineeringly possible unless it is geologically possible. When you say geologically possible, you do not mean merely that the canyon is around it, you mean that there will be rock foundations that will hold water. You mean there are walls that you can anchor into. Therefore, you have said that a 770-foot dam, the right geology existed for it, not the height of the walls. But you cannot find in there where they say it was geologically possible.

Mr. BROWER. Then I will go to the next sentence.

Senator ANDERSON. Stay with this one. I would like to stay with the one I do not like.

Mr. BROWER. Now we are going back to the Bureau sentence.

Senator ANDERSON. Yes, I do not like that.

Mr. BROWER (reading):

> The rock forming the abutments and the foundations is massive Navaho sandstone of Jurassic age.

Senator ANDERSON. You have been pointing out that that was not very good.

Mr. BROWER. I have not been pointing that out, sir.

Senator ANDERSON. You have been reading Mr. Weymouth and various other people so that would indicate that that high dam was not feasible.

Mr. BROWER. That indicates initially that they were worried about this Navaho sandstone.

Senator ANDERSON. All right.

Mr. BROWER. By the 1950 report, they had ceased to worry about Navaho sandstone.

Senator ANDERSON. Yes. We believe in the theory of evolution that as you get more information you change your opinion.

Mr. BROWER. But the Bureau is not going to like the next documentation.

Senator ANDERSON. Maybe the Bureau will not like it, but I did not like this one.

Mr. BROWER. The committee could perhaps ask the Bureau to make a statement at this point as to whether my statement that it is geologically possible is or is no defensible. We are taking out the other elements and just sticking to geology.

Senator ANDERSON. I do not know who wrote this record. Do you know who wrote this 1950 basic report? Of course, it was not a report, it was a mere inventory report, not a basic report.

Mr. BROWER. Well, this is the report, I believe, that your bill is predicated on.

Senator ANDERSON. Wait a minute. This is the inventory.

Mr. BROWER. That is the basic report.

Senator Anderson. That is correct.

Mr. BROWER. So the inventory suggested the high dam.

Senator ANDERSON. Do we know who wrote that?

Mr. Larson, do you know who wrote this basic report, so-called, 1950?

Mr. LARSON. This report was written in the regional office in Salt Lake City.

Senator ANDERSON. Do you know who wrote this particular part relating to Glen Canyon Dam? Is he here?

Mr. LARSON. No, I do not know. We have our own geologist working with the geologists and designers of the Denver office and we conferred back and forth all the way through.

Senator ANDERSON. I would want to confer with him to see what he meant by it.

Go ahead.

Mr. BROWER. Early in 1954——

Senator ANDERSON. You are going to find in here the reference you made to this other? It is not on 128.

Mr. BROWER. Maybe it is 148. I am scratching my head to remember last January a year ago and a lot of silt has accumulated in my head since.

Senator ANDERSON (reading):

An alternative plan would place a higher dam at the Glen Canyon site to raise the water 605 feet above the present stream bed.

Mr. BROWER. So I added the 120. That is what they have found since.

Senator ANDERSON. This is not a recommendation for such a dam?

Mr. BROWER. No.

Senator ANDERSON. What did you say about it? "The Bureau itself suggested a high Glen Canyon dam 605 feet high in 1947." It did not suggest it, did it?

Mr. BROWER. It did suggest it, I believe.

Senator ANDERSON. It suggested a different dam and said there were alternates to it.

Mr. BROWER. I would be perfectly happy to change that to "inventory." It makes no difference.

Senator ANDERSON. It may not to you, but it does to me.

Mr. BROWER. Again, I will put that in as a suggestion that it was the 750-foot high Glen figure that Mr. Tudor put in and then argued against it owing to the excessive evaporation. When the Bureau corrected its error and found that a 735-foot dam would provide all necessary alternative storage, there were still no geological objections. In May the Bureau complained about the high costs of a 735-foot dam but admitted that it would not know what the cost would be without costly engineering surveys. In late June the Reclamation Commissioner claimed that a 700-foot dam was the maximum that could be built for geological reasons, which he did not describe. Three days later one of his regional directors said that final detailed engineering studies would be required to determine whether the dam could be built that high, higher, or lower.

November 1954

You already have Secretary McKay's letter of November 30 to me about the geological difficulties at Glen Canyon. Senator Kuchel entered it in the record for February 28.

January 1955

On January 19 Under Secretary Davis wrote me:

In your letter of December 30 you suggest that the Bureau of Reclamation should prepare plans for the protection of Rainbow Bridge from a high Glen Canyon Reservoir with a water surface elevation of 3,735 feet above sea level.

As pointed out in our letter of November 30, there are geological reasons for limiting the height of the proposed reservoir to water surface elevation 3,700. Under these circumstances expenditures of funds at this time for plans for protecting Rainbow Bridge from a high Glen Canyon Dam could not be justified. However, if after authorization of the project, when more intensive geological explorations are made, it develops that the foundation materials are competent to support a dam of greater height, the studies necessary for plans for higher protection of Rainbow Bridge could be undertaken at this time.

Senator ANDERSON. Does that strike you as a reasonable attitude?

Mr. BROWER. Not totally. I would not say it was unreasonable, but I would say I had a different opinion of what they might do while running studies for a dam 200 feet high. They might as well see what would happen by raising the dam 35 feet while they had the crews in there.

Senator ANDERSON. Even though it required wholly different exploration?

Mr. BROWER. It might, and it might not. I think that they should at least give it consideration, when running a profile of the river and selecting various possible sites.

February, March 1955

You will recall that on Monday Mr. Dexheimer was concerned about the safety of the Glen Canyon Dam only if it exceeded 700 feet. His conclusions, he made it clear, were not tentative. They were firm up to 700 feet, "as firm as it is possible for us to get," he said, "with much more investigation than usual."

Last October 26 he had written to Richard Bradley, Cornell physicist:

At present our design specialists are quite concerned as to whether or not the foundation characteristics of the Glen Canyon and Gray Canyon sites are capable of safely supporting high dams 700 and 575 feet, respectively.

Senator ANDERSON. Do you think that is contradictory?

Mr. BROWER. I do

Senator ANDERSON. You mean if you started in October to make studies and by February next he found out certain facts were available he should testify before us?

Mr. BROWER. That would not be contradictory.

Senator ANDERSON. What do you find in here that is contradictory? He said something in March 1955 after he had made his examination. He said something in October before he made his examination. What is contradictory about that?

Mr. BROWER. I would like to know what examinations were made. I am just curious.

Senator ANDERSON. Why not ask that instead of implying some differences.

Mr. BROWER. Those between October and now.

I have talked briefly about this subject to one of the foremost civil engineers of the United States whom I happen to have known well for the past 20 years. He had the figures in mind—the safe 700-foot dam that suddenly becomes unsafe if 35 feet is added. He laughed and pointed out to me with a diagram, as Mr. Jacobson did a year ago, that when you add height to a dam you start in adding it at the bottom, upstream and down and you come up with the same unit load on the bearing surface—roughly, as I understood it, the reason why taller people have bigger feet.

Maybe high Glen Canyon Dam can't be built. No one knows: But if 735 feet is unsafe, then there should properly be quite some concern about 700 feet. The Bureau's whole project is at stake.

UNCERTAINTIES AND THE EFFECT UPON COST

How big the dam will be at Glen Canyon, how much excavation there must be to find suitable foundations, how much grouting to correct seepage losses in an arid region where the water table is extremely low, how much to protect Rainbow Bridge—all this has bearing on the cost of Glen Canyon Dam. And if the cost of Glen Canyon so far exceeds the estimate that its hydroelectric power cannot compete with other sources of energy, then the dream of a generation fades away. I think we are all vitally interested in how important this bearing on cost actually is. For example, if high Glen can be built instead of Echo Park, Split Mountain, and low Glen, the estimated cost of the Colorado storage project should drop about $200 million even after protecting Rainbow Bridge.

That saving is so great as to dwarf the cost of complete studies, prior to authorization, of the Glen Canyon site—and to dwarf the cost of the major dam the Bureau contemplates to save Rainbow Bridge. This would be a dam nearly 200 feet above the stream channel, about as high as the proposed Split Mountain Dam. Is it feasible? What detailed studies have been made? Secretary McKay has said that any necessary steps will be taken to protect Rainbow, and this type of protection has been talked about for years. What will it cost? Is this cost now in the estimate before you for Glen Canyon Dam?

Perhaps it isn't much. Perhaps it's millions. Perhaps a cutoff dam cannot protect Rainbow Bridge because of the porosity of the rock. What then? Should we lower the level of Glen Canyon, or try to get by with reinforcing the bridge against the action of the fluctuating reservoir, having first given park experts a chance to choose between losing Dinosaur and having to boat, or walk through about a mile of mud to see Rainbow Bridge?

We'll know more about answers when there has been more study. Meanwhile we know that the effect on the entire project of any such uncertainties can be major—and we may have an object lesson staring us in the face in the sentence the then Acting Commissioner of Reclamation wrote to Congressman Saylor on May 21, 1952, to explain the jump in the estimate for the Missouri River Basin project from $840 million to $3,140,303,000:

> This increase is primarily the result of the incompleteness of the investigations and the inadequacy of the engineering data on which the cost estimates were prepared at the time the project was authorized.

Under Secretary Davis wrote me as follows on this subject in the January 19 letter:

> It was impracticable to make detailed project investigations for most of this large, complex basin project before it was authorized. Consequently, the original plans were, to a great extent, based on reconnaisance studies and the original plans specifically recognized this and set forth the requirements for additional planning. In fact, the incompleteness of the plan and inadequacies of the engineering and cost data at the time the project was authorized were recognized in Senate Document 191, 78th Congress, the authorizing document from which the following statements are quoted:

"The project plan includes hundreds of major engineering works, such as dams and powerplants, and thousands of important structures. The plans on which the estimates are based were necessarily of a preliminary nature. At many of the dam sites exploratory work has been carried far enough to obtain dependable basic data. At other sites further exploratory work must be undertaken before details of the structures can be determined and better estimates made. * * * All cost estimates are tentative, and are subject to revisions in the light of further information which must be developed by exploratory work and detailed design studies before construction is undertaken. A lump-sum allowance has been included for contingencies for unforeseen conditions, but no allowance has been included for major economic changes. All estimates are based on costs as of January 1, 1940, and an appropriate factor will therefore have to be applied to conform such estimates to prices existing at the time the construction of any feature of the development is initiated."

Detailed project investigations have not yet been made for certain units of the Missouri River Basin project, but the situation in respect to the planning for Glen Canyon Reservoir is entirely different. In this case detailed project investigations have been made. We see no reason to question the adequacy of the Bureau's cost estimates for the Glen Canyon Dam.

There nevertheless is a question, How big a dam can be built? Big enough to save $200 million and a park?

WHICH IS MORE IMPORTANT—POWER OR WATER?

If we pursue this question, we may well find savings that will dwarf the $200 million high Glen could save.

We are not convinced that the Bureau needs anywhere near the amount of storage it proposes to build. Its figure of plus or minus 48½ million acre-feet is more than twice what the Bureau itself says is necessary for river regulation—23 million acre-feet. Herbert Hoover said 20 million acre-feet would suffice. Does the Bureau's 23 million ignore part of the function of Hoover Dam? For example, 9½ million acre-feet of the capacity of Hoover Dam must be vacant each April 1 to provide for flood control. If floods are controlled by upstream structures, then at least part of this space should be available for storage for diversion elsewhere by exchange. It is up to the Colorado Basin States to agree among themselves not to waste this huge capacity, roughly 1½ times that of Echo Park Dam.

So the 23 million acre-feet is probably high. To this the Bureau has added 25 million acre-feet to increase power head and to control sediment. But this is not controlling sediment; this is collecting it, and is burying forever the productivity of millions of acres of rangeland and farms. The Bureau proposes very little even of this type of control for the worst sediment producers of all—the San Juan (upper reaches), Little Colorado, Coconino, Virgin, and Dirty Devil Rivers. Meanwhile the Department of Agriculture has shown the promise of a dynamic soil-conservation program, now languishing.

Part of the Bureau's 25-million surplus storage is the 11½ million acre-feet of dead storage, the primary function of which is to build power head; the dead storage area of a reservoir is one of the last areas to be encroached upon by silt—the silt is dumped where the river slows down at the head of a reservoir.

Therefore it seems that good planning would require the Bureau to make full use of the Hoover Dam facilities already in existence and to trim the storage to what is required for year-by-year increases in industrial, domestic, and agricultural depletions—and the power incident thereto. To save needless evaporation loss, they should exclude the reservoir area added to produce power revenue.

If the project were so trimmed and if the emphasis were on domestic and industrial use, I stressed last July to this committee, rather than on agricultural use—Utah is now losing more water by wasteful irrigation methods than it stands to gain from the Colorado system—then the tremendous amount of water that will be lost under the Bureau plan will be available for the future destiny of the upper basin. There would be emphasis on restoring the watershed, for example, so that the ground storage of water could be stepped up to minimize evaporation and to regulate streams in the natural manner. The improved watershed would be better rangeland and a better place to look at. Evaporation from the main storage reservoirs might be reduced 500,000 acre-feet per year. Evaporation and other losses resulting from uneconomic agricultural uses of the water would be many times as great in the total saving.

It seems well worth considering, for example, what would happen if power from coal were substituted for Echo Park and Split Mountain Dams' hydropower in the course of the Bureau's proposed payout period. There would be a saving of $147 million over the 44 years, and a market would have been provided for some 35 million tons of upper-basin coal, which could conceivably be pumped to the powerplants through a pipeline.

There might be similar savings in substituting coal and coal mining elsewhere in the Bureau's project. This could be a boon to upper-basin mining economy 2 years from now, not 20 years or so.

How this could come about is worth some detailed attention.

IS DINOSAUR NATIONAL MONUMENT NEEDED FOR POWER?

The Bureau proposes to charge nearly 90 percent of the cost of Echo Park and Split Mountain Dams to power production but has given the public no clear analysis of alternatives. The following few pages show that:

1. Tax-free low interest rate steam-electric plants could sell power for appreciably less than the proposed tax-free low-interest rate hydroelectric plants.

2. Private utility companies could sell steam-electric power at only the small extra cost necessary to pay the taxes otherwise paid by the electorate-at-large instead of by subsidized power users.

Senator MILLIKIN. Would the mining of coal and the processing of coal have anything to do with the regulation of the river?

Mr. BROWER. No, sir, those would not—that is, if this were used for power and the upper project was reduced to a water project instead of a power project, with water added, there would be no problem of regulation. There would be only the problem of less production of power, and that can come from coal with these advantages.

Senator MILLIKIN. Would coal help finance participating areas?

Mr. BROWER. That is a separate question, but a very good one, if I may say so, and perhaps is the crux of the matter.

Senator MILLIKIN. If it is the crux of the matter, it is important to consider, is it not?

Mr. BROWER. Yes, it is.

Senator MILLIKIN. In other words, your whole coal suggestion adds nothing to the regulation of the river, nothing to the irrigation of the

land as an alternative to the production of power, and adds nothing to the financing of the participating areas or the regulating reservoirs, the main reservoirs?

Mr. BROWER. I would not try to suggest that the coal would function in the regulation of the river.

Senator MILLIKIN. Obviously it would not do so.

Mr. BROWER. It would not do so. I do suggest here the value of coal as a substitution for hydro power that will reduce the cost to the country as a whole in the case of Echo Park by $147 million during the course of the 44-year payout.

Senator MILLIKIN. I am suggesting to you that it would have nothing to do with the rgulation of the river.

Mr. BROWER. That is true

Senator MILLIKIN. That is important, is it not?

Mr. BROWER. That is important, but it does not affect the presentation I am making here. I am suggesting only—

Senator MILLIKIN. I am not suggesting that your presentation devotes itself to the main purposes of the regulation of the Colorado River. I do not have that burden, that is your burden.

Mr. BROWER. My burden that I have undertaken here is to show that the project presently before the committee in its storage aspects can be reduced to where it concentrates on the water aspects and not on the power aspects, and that for the lost power, coal would provide a substitute which would cost millions of dollars, hundreds of millions, less.

Senator MILLIKIN. Have you had a study made of the coal?

Mr. BROWER. Yes, sir.

Senator MILLIKIN. Who made that?

Mr. BROWER. The study that I am citing here is made by Alexander Hildebrand.

Senator MILLIKIN. And considering what coal deposits?

Mr. BROWER. We used the figure of 400 billion tons as the upper basin coal reserve. Earlier this week Senator Barrett used the figure of 600 billion tons and last year Senator Bennett used the figure of 800 billion. We used the figure 400 billion, which is what is in the Bureau's report, House Document 364.

Senator MILLIKIN. And due account was taken of the cost of mining and transportation and other appropriate costs?

Mr. BROWER. Yes, sir.

Senator MILLIKIN. So you emphasize, do you not, that if you use this coal you have this electrical power available and you would be frustrating the purpose of the upper Colorado River project so far as the regulation of the river is concerned?

Mr. BROWER. No, sir. I guess I have not made myself clear on that.

Senator MILLIKIN. Make it clear to me how burning coal for power will provide any revenue for building participating areas.

Mr. BROWER. What it provides is a differential in the resource of the basin as a whole. You would be using coal, yes, instead of falling water. The coal is there in predictable amounts. It employs people in obtaining it and in transporting it. Even allowing for that in the course of the 44 years of the proposed payout for Echo Park, you would be $149 million better off in the total economy.

Senator MILLIKIN. I am not prepared to accept that figure, but I am driving to the sole point of how the coal would serve the purposes of the project.

Mr. BROWER. Do you refer, Senator Millikin, to the purpose for producing revenue?

Senator MILLIKIN. That is one of the purposes.

Mr. BROWER. Do you want me to speak to that?

Senator MILLIKIN. Speak to that.

Mr. BROWER. The subsidy which comes from users of energy to growers of crops in past theory of reclamation has come with no major objection from the use of falling water. It seems to me that if it is a great gain to the Nation's economy, that if it is worth the Government's going in to do this with falling water, it is worth the Government's giving the same sympathetic treatment to using it for burning coal.

Senator MILLIKIN. Does the Government acquire the coal lands?

Mr. BROWER. The Sierra Club——

Senator MILLIKIN. What would be the political philosophy that would warrant our doing that?

Mr. BROWER. The Sierra Club does not take a stand with regard to public versus private power. It does point out that if one type of production measured on the same basis, the same yardstick, costs more than another, it is to the Government's benefit to use the more economical means.

Senator MILLIKIN. What will the use of that have to do with the regulation of the river and the production of those features of the whole project that has to do with the regulation of the river and all of its purposes?

Mr. BROWER. The regulation of the river and the revenue that was needed for paying that back can come from means that people more skilled than I can outline. We know that in the course of the operation we have built up a differential of this vast sum. Now, I think that it is thoroughly within the province and the ability of Congress to determine whether that sum, that differential, should be used to help agriculture, to help whatever it chose to help, and that it might very well say that in this case it should help agriculture.

Senator MILLIKIN. Do you know in any instance where the Government has developed coal deposits to develop power?

Mr. BROWER. No, sir, I do not.

Senator MILLIKIN. So you would be embarking on a new field of activity entirely?

Mr. BROWER. It would be a new field of activity if it were a question of the Government's embarking on it, which I say neither aye nor nay to.

Senator MILLIKIN. Who would embark on it if not the Government?

Mr. BROWER. If the people in the region who say they are going to pay for these projects, because the water users are also the power users, who are by the same means adding to the power rate if necessary, put in this increment which then goes to help the food users, the food growers, the same thing will have been accomplished. Now, the Government does not have to do that. That can be done on local initiative. Determining the tax on benefited areas, the tax on the power, will do what the tax to the entire Federal Government is expected to do to get this thing started, or at least to pay it off.

Senator MILLIKIN. I suggest that you have a very fanciful proposal which would take 10 times the selling effort that you are making in connection with the upper Colorado River Basin storage project. Imagine inviting the people to go into a coal-processing venture to generate power from coal to bring the revenues, or part of the revenues, for the development of an irrigation project or a river regulation project. How would you do that?

Mr. BROWER. Well, I am not a very good salesman on such matters myself.

Senator MILLIKIN. Why do you make the suggestion that you yourself cannot back up with an ABC presentation of how it would work?

Mr. BROWER. I have that here, sir.

Senator MILLIKIN. Well, let us have it. Let us see just how it would work.

Mr. BROWER. 3. Steam plants would avoid a large increase in the national debt.

4. Steam plants take far less time to build, are not involved in the controversy as to whether the dams could provide power in dry years. Furthermore, they could help the unemployed upper basin coal miners.

5. Estimates on steam-plant costs are more reliable than dam-cost estimates and the water power may actually cost more than estimated.

6. Power production cannot on any sound basis justify flooding the canyon floors and destroying scenic, geological, and related values of national importance.

The Bureau of Reclamation has not released any clear comparison between their Colorado River upper basin proposal and the best alternative proposal which would avoid building Split Mountain and Echo Park Dams in the canyons of Dinosaur National Monument.

Senator MILLIKIN. Keep to your coal development, now.

Mr. BROWER. This, sir, is my prepared statement and it all relates to coal development in the next few pages.

Senator MILLIKIN. That was a complete deviation, but go ahead.

Mr. BROWER. It is insufficient to state that these dams are the most economic when alternatives are admitted to be feasible.

Senator MILLIKIN. Assuming that that be true, what about your coal proposal?

Mr. BROWER. Sir, you do not wish me to follow the orderly presentation?

Senator MILLIKIN. I do not care about your orderly presentation, I am driving to the single point of coal as a substitute for water power and the development of our river project.

Mr. BROWER. The public is entitled to be sure that optimum alternatives have been seriously studied and to know what price differential the Department of the Interior has decided is too great to pay for retaining this important recreational region in its natural state.

In the absence of any such clear Government presentation the public is impelled to make its own appraisal as best it can. The price differential must be judged in terms of water storage, water distribution, water evaporation, and power generation. Most of the cost of these two dams is being charged to power generation. The purpose of this memorandum is to discuss some aspects of the subject of power generation as related to this proposal. The water problems are being presented elsewhere.

BUREAU'S PROPOSAL

The Bureau of Reclamation proposes to install 300,000 kilowatts of total power generating capacity at Split Mountain and Echo Park Dams.

Senator MILLIKIN. The Bureau has not proposed anything for the development of coal for the regulation of this river, has it?

Mr. BROWER. The Bureau has not, sir. What I am trying to point out here, and I have this in, I think, a progressive manner, one item after the other, is what the power output of dams in Dinosaur would be and how we would go about getting the equivalent from coal and what is involved financially.

Senator MILLIKIN. Tell us how you go about getting the equivalent from coal and putting it to the use of this project.

Mr. BROWER. Sir, I think that all I, as a layman, can propose to do here, or attempt to do, is to show by evidence that we have gathered for presentation to the Senate what benefits we think there are. There are people far wiser than I, than anyone in our organization, presumably, who given that advantage I would hope could devise the precise means of going about it. That is something quite beyond my competence.

Senator MILLIKIN. Then is it not beyond your competence to make a suggestion of that kind at all? Do you live in a coal-producing region?

Mr. BROWER. No, sir. There is a very little coal produced or available, but not economically so. We import our coal.

Senator MILLIKIN. It involves the use of acquiring lands, some of them Government lands, some of them private lands, technical mining methods of coal, technical production of coal in a commercial shape. however it might be done, and all kinds of things that so far have not been considered pertinent to the development of rivers?

Mr. BROWER. Senator Millikin, you realize that I am not advocating, and my organization is not advocating, that the Government go into this business of producing coal.

Senator MILLIKIN. Then I would like to know how you are going to produce that coal and get the revenues from it available to the development of this river.

Mr. BROWER. I would suggest, again trying to say it in other words, because I have not been very clear on this I am sure, that the coal could very well be produced by the methods now being used for production except that they would be kept busy. When it was used in a steam-power plant which could likewise be privately financed, it could be used with the understanding that the power users, who are now to pay for the cost of 88 percent of this project, would also pay the cost that remained of this project after the power element was diverted, or was produced by an alternate means.

It would be used—the power users would pay whatever they pay the power compaany an amount which would in essence be added taxes which then the power companies would pay over.

Senator MILLIKIN. The Government's use of water for generation of power, in connection with running rivers, rests on an entirely different conception than the Government development of coal for the production of power, the coal having nothing to do with the running of rivers?

Mr. BROWER. That is true in the past. I do not think that we need always to be bound by that and that we perhaps should not be in——

Senator MILLIKIN. Are you really suggesting that as an alternative to this plan?

Mr. BROWER. I am suggesting that this matter be investigated: Of finding how to take the money that the power users are going to put into this project and to have them put it in by another system that, so far as Echo Park and Split Mountain are concerned, would enable us, after 44 years, to save more than $147 million than we would under the Bureau's plan.

Senator MILLIKIN. You could do that by direct appropriation?

Mr. BROWER. By direct appropriation, but if that were done, there would be no point in appropriating an additional sum to build a power source that is not as economical as coal.

Senator MILLIKIN. I suggest that if the coal is the more economical way of doing it, that private enterprise will find a way to do it.

Mr. BROWER. I think private enterprise could find a way to make part of the revenue available for such other subsidies, channeled through the Government.

Senator MILLIKIN. I suggest that is entirely speculative, it is entirely a wishful rabbit that has been scared out of the bush and that nothing of that kind is going to take place at all; that it is a very speculative thing from its legal basis, and puts the Government into something entirely new, where if we consider this project controversial, that will be 10 times as controversial and adds nothing whatever to this discussion.

Mr. BROWER. Senator, I defer to the Senator's long experience in this field and I feel presumptuous in even attempting to discuss something of this nature with a man who knows so much more about it.

Senator MILLIKIN. I am not sure that that is correct, but we are in a field of free discussion, and I am glad to have your opinion, but you will not try to restrict mine either; will you?

Mr. BROWER. No, sir. It seems to me perhaps we are reaching a new horizon and very rapidly now in a whole energy situation and that it is immediately at issue in this upper Colorado project before us. They are seeking energy first, river regulation second, right now. The river regulation will be needed, there is no question of it, but it is not needed now and it perhaps will not be needed for 20 years.

Senator MILLIKIN. Of course, what you said just now is entirely controversial to put it mildly, as to whether it will not be needed for 20 or 30 years. I suggest it is needed right now.

Mr. BROWER. One of the earlier witnesses—I do not know whether you were here when he presented it—Mr. Tillman, pointed out using the Bureau's figures that all the water which is proposed to be used in projects now under construction and those before you in Senate bill 500 and including San Juan-Chama and Navaho, will not total up to what is available without any storage reservoirs whatever.

Senator MILLIKIN. I suggest to you that the building of this river improvement will not be done overnight, it will take 15 or 20 years to build lots of the units, and that is what we should occupy the time that you are speaking of. At the end of that time we have something to work with.

Mr. BROWER. At the end of that time, with the rapid change in the energy picture in this country, I think it is quite likely that hydro-

electric power, except in regions of surplus water, is going to be one of the most expensive powers relatively, that we have.

Senator MILLIKIN. You are entitled to that poinion, but you have not demonstrated it.

Mr. BROWER. Shall I go on with my statement?

Senator MILLIKIN. Yes, go ahead.

Mr. BROWER. The public is entitled to be sure that optimum alternatives have been seriously studied and to know what price differential the Department of the Interior has decided is too great to pay for retaining this important recreational region in its natural state.

In the absence of any such clear Government presentation, the public is impelled to make its own appraisal as best it can. The price differential must be judged in terms of water storage, water distribution, water evaporation, and power generation. Most of the cost of these two dams is being charged to power generation. The purpose of this memorandum is to discuss some aspects of the subject of power generation as related to this proposal. The water problems are being presented elsewhere.

BUREAU'S PROPOSAL

The Bureau of Reclamation proposes to install 300,000 kilowatts of total power generating capacity at Split Mountain and Echo Park Dams. They estimate an annual firm output capacity of 1,660 million kilowatts-hours which they propose to sell at 6 mills per kilowatt-hour at "load centers." Any excess over the firm capacity would be sold at 3 mills per kilowatt-hour. The portion of the total $282 million project cost which the Bureau proposes to amortize with power income is $248 million, which makes this expensive water power. (See Bureau of Reclamation Supplemental Report, October 1953). They indicate the actual cost of this power by their own method of calculation will be 6.2 mills per kilowatt-hour.

In comparing the above costs to alternative Government hydroelectric projects it is difficult to predict the charges the Bureau would assess against power production. This is due to varying assumptions regarding such items as the extent of subsidy of irrigation costs by power revenue, the subsidy in use of Government funds without interest for nonpower generating portions of the project, and the lack of any Government reimbursement for Government land used or for assumed benefits to flood control and recreation. Rather than attempt such a comparison therefore, we will instead present the comparative cost of generating an equal amount of power with several suitable steam powerplants located at appropriate load centers.

STEAM PLANT ALTERNATIVE

The cost of power from steam powerplants varies with many factors. However, it is possible to predict the cost of such power, even without detailed location information, more accurately than the Bureau can predict its dam costs, as indicated by past records on the accuracy of steam powerplant cost estimates as compared to dam cost estimates. A recent survey of modern steam plant costs by competent professional engineers yields the typical information given below for plants in the 50,000 to 300,000 kilowatt capacity size range and with

the same peak power to average power output ratio assumed by the Bureau for the combined Split Mountain and Echo Park powerplants. In order not to be unfair in this comparison it has not been assumed that these moderate sized plants would equal the best recently built plants with less than $125 cost per kilowatt of capacity and a 37 percent thermal efficiency for coal-fired plants. It has instead been assumed that more average modern plants would be built costing $150 per kilowatt of capacity and having a 30 percent thermal efficiency.

There follows a table here which, if it is your pleasure, I will not read.

Senator MILLIKIN. Put it in the record.

Mr. BROWER. Thank you, sir.

(The table referred to follows:)

	Private utility plants	Federal steam plants
Plant investment for 3 to 6 plants: 285,000 kilowatts,[1] at $150	$42,750,000	$42,750,000
Operating and investment costs per kilowatt-hour, fixed costs:		
Interest on investment	[2] 2,565,000	[3] 1,069,000
Income and property taxes	[2] 2,565,000	
Depreciation, at 3 percent based on 20-year amortization with a sinking fund	1,283,000	1,283,000
Total	6,413,000	2,352,000
	Mills per kilowatt-hour	*Mills per kilowatt-hour*
Operating and investment costs per kilowatt-hour: At the assumed average annual output of 1,660 million kilowatt-hours this fixed cost is (This is an average of 66 percent of full load. Any sale of power above 66 percent would decrease this charge per kilowatt-hour.)	3.9	1.4
Operating (production) costs:		
Labor and supplies	.8	.8
Fuel costs: It is possible that part of the fuel could be very cheap natural gas, but we will assume coal at $4.75 per ton or 24 cents per million B. t. u. (Federal Power Commission reports show powerplant fuel costs in the upper basin of 12 to 27 cents per million B. t. u.)	2.7	2.7
Total cost of power at steam plant	7.4	4.9

[1] Drop in installed power if high Glen Canyon Dam used instead of Echo Park and Split Mountain Dams, per Under Secretary Tudor, Jan. 10, 1954.
[2] Per year, at 6 percent.
[3] Per year, at 2½ percent.

Senator MILLIKIN. Generally speaking, the same procedure will be available in all the areas which are now supplying hydropower which also have convenient coal deposits, is that right?

Mr. BROWER. I cannot speak to that, sir, because, well, I think it is probably true. There, again, it is the constant neck-and-neck competition between hydro and steam power.

Senator MILLIKIN. You inject a very interesting feature in the TVA controversies constantly going on—TVA areas being readily available to very fine coal deposits.

Mr. BROWER. Some small transmission-line cost may have to be added to this to provide equivalent distribution to that included in the Bureau's proposal, but since we have assumed several plants located at load centers most of the cost of distribution for the power would be taken care of by plant location, so for purposes of rough comparison it can be ignored. If a single large plant were built the transmission line cost could be as much as $10 million, but in this case the plant could be located near cheap gas fuel, or at a coal mine,

providing cheaper coal, and a single plant would cost less than several smaller ones. The total power cost might therefore actually be reduced. The private utility power would be reduced to about 6.9 mills per kilowatt hour and the Federal steam power to 3.8 mills per kilowatt hour if fuel were used costing 12 cents per million B. t. u. and $10 million were spent on transmission lines amortized in 50 years, with all other costs remaining constant.

EFFECT ON TAXPAYERS AND POWER USERS

It appears that Federal hydropower from Echo and Split Mountain Dams would cost both the taxpayers and the power users substantially more than Federal steam power. Private utility steam power would cost the power users a little more than the proposed hydropower, but would cost the taxpayers a great deal less.

The 1.4 mill difference between a 7.4 mill private utility price and a 6 mill kilowatt hour Federal hydroplant price would cost the power users an extra $2,320,000 per year, which is hardly enough to cause the users financial distress and is less than private steam plants would pay in income and property taxes. In order to save the upper basin power users this small extra power bill the United States taxpayers as a whole are being asked to provide the following subsidies:

1. Pay $2,565,000 per year of additional income and property taxes otherwise paid by the steam plant utility companies.
2. Sacrifice one of the most scenic canyon parks in the world to become just another reservoir.
3. Increase the national debt unnecessarily by $282 million minus the cost of the same water storage at other sites.
4. Run the risk of an enormous investment which FPC data indicate may not have enough water to run the turbines.
5. Wait for a 6-year, or longer, construction job when steam plants can be built in less than half the time, and as needed, instead of being based on uncertain long-range predictions.
6. Run the risk that the dams may cost far more than estimated. It was stated in the recent upper basin hearings in the House that the Bureau's past project costs have averaged twice their original estimates. If the cost went up only 30 percent the Bureau's power price would have to go to about 8 mills, or the public would have to increase the subsidy another $80 million.
7. The Bureau's proposed 6-mill price is 0.2 mill below their admitted cost, or about $330,000 per year loss. They plan to offset this with cheaper Glen Canyon Dam power, but it is still an admitted loss for the Split Mountain increment of power generation.
8. Potential relief for unemployed upper basin coal miners is ignored.

FUTURE ENERGY SOURCES

It may be argued that a few decades in the future the coal, oil shale, and gas fuel supplies of the region may begin to be scarce. However, a look at the technical progress of the last two decades, combined with knowledge of the present stage of development of nuclear (atomic) power, leads us to the conclusion that it is not safe to predict that there will be, in this century, a strong economic incentive to provide this relatively small and expensive increment of hydroelectric power.

When it is vital it would be wise not to have the damsites already partially filled with silt.

CONCLUSION

The Department of the Interior has indicated that it would not recommend on the basis of power needs alone what it curiously calls an "alteration" of the canyon floor with 500 feet of water. The above analysis corroborates this conclusion and indicates that power production should not even be used as a significant partially supporting argument for flooding the heart of the national monument. In a decade or two the recreational use of these canyon floors will probably increase such that a proposal to flood them would be like proposing today to flood Yosemite Valley for a subsidized and uncertain power saving of 1.4 mills per kilowatt-hour to the users of a rather small increment of power expansion.

The preceding analysis entitled "Is Dinosaur National Monument Needed for Power?" was prepared by Alex Hildebrand, licensed professional engineer, who since 1950 has been manager of the development division of a prime research and development contractor of the AEC. This company has studied proposals involving large amounts of power. For 15 years prior to that he was engineer for a large oil company, progressing to position of assistant chief engineer of a large refinery. His extensive experience included two refineries, each of which generated most or all of its own power. The Sierra Club neither advocates nor opposes Federal subsidization of steam plants. We submit, however, that the following provides the proper basis of comparison of benefits.

Here is a table I would like to skip reading.

Senator MILLIKIN. What is it?

Mr. BROWER. This is the table which shows the total saving in 44 years.

Senator MILLIKIN. It may be put in without reading it. Of course, it is understood that because the detail of that is not challenged, that it is not accepted.

Mr. BROWER. I beg your pardon, sir?

Senator MILLIKIN. I say, it is also understood because the detail you are putting in the record is not disputed, which we do not know about, that it is not accepted as correct.

Mr. BROWER. Sir, then may I read it?

Senator MILLIKIN. Read it; and if anybody wishes to make a reply, we will provide one.

Mr. BROWER. Thank you, sir.

(1) Echo Park, Split Mountain hydro, per kilowatt-hour at market	mills	6.2
(2) Equivalent, steam-generated	do	4.9
(3) Saving, with steam alternative, per kilowatt-hour	do	1.3
(4) Echo-Split annual generation, billion kilowatt-hour	do	1.66
(5) Annual savings in operating and investment costs, steam over hydro		$2,158,000
(6) For 44 years, rounded		$95,000,000
(7) Interest subsidy saved taxpayers by earlier retirement of irrigation allocation to participating projects, at 2½ percent		$52,000,000
(8) Total saving, 44 years		$147,000,000

Senator MILLIKIN. Do you have any idea of the total benefits, including indirect benefits to the Federal Government of irrigated areas,

development of irrigated areas? I mean, my State sends about half a billion dollars a year to the Federal Government in taxes. If we were not in part an industrial economy and in considerable part an irrigated economy, we would be a grazing State, and would be sending only a very small fraction of that to the Federal Government.

Mr. BROWER. The indirect benefit question, Senator Millikin, is one that I do not know a great deal about, but I have certainly raised a lot of questions in my own mind and these pertain particularly to this question. If we want to list the indirect benefits from subsidies going to agriculture, then why should we not similarly investigate the indirect benefits from subsidizing any manner of things, including industry, because they, too, if subsidized, will provide income to people and they will buy things, and the money that they circulate in their communities, and I imagine you would get a great deal more by subsidizing industry than you do by subsidizing agriculture.

Senator MILLIKIN. With one difference, that the Congress for a long period of time has already established this policy so far as agriculture is concerned and has no resemblance to what you are talking about here.

Mr. BROWER. But that does have a bearing on indirect benefits if the taxpayers as a whole are underwriting the project.

Senator MILLIKIN. Do you not recognize the difference where the policy of Congress has been to aid agriculture and reclamation projects?

Mr. BROWER. I do, sir.

Senator MILLIKIN. And where it has not done so?

Mr. BROWER. I do recognize that difference and to my way of thinking that may be one of the things that we may have to continue to do long into our future when the trend is away from the farm and into the city to encourage the people to go out on the farm to grow the things that we city people have to eat.

Senator MILLIKIN. That has been going on now. The first Reclamation Act was in 1902.

Mr. BROWER. I recognize that and I do not see that that is going to change, but I do think if we are talking of indirect benefits then we are talking of this type of program of a lesser benefit.

Senator MILLIKIN. What you are now talking about is an additional item, coal, which has nothing to do with water reclamation projects.

Mr. BROWER. It has nothing to do so far.

Senator MILLIKIN. If you are going to substitute coal, you might as well substitute any other part of American industry.

Mr. BROWER. That, I am not advocating.

Senator MILLIKIN. But I mean, logically, you could substitute any other part of the American industry. Once you get away from the incidence of the river, something that has nothing to do with the river, once you have made that jump, you can make all kinds of jumps which will not be made. You have injected a nice point of speculation, but that, in my judgment, is all it amounts to.

Mr. BROWER. Well, I would say that any such steps would have to be taken with extreme caution and that it is quite possible that it would not be the Federal Government's function at all, but the function of the local tax authorities in what they used for the revenue that is inherent in this difference in cost.

Senator MILLIKIN. It would not be the function of private enterprise to build public works; would it?

Mr. BROWER. Not to build public works. I would not ask them to build any of this. This would be tax money, whether you figure that it comes from the local tax-collecting authorities, or the Federal tax-collecting authorities, which will materialize if you use the more economical means of producing power and which then can be appropriated wherever the legislative body wishes to appropriate it.

Senator MILLIKIN. Well, wherever it wishes to do so.

Mr. BROWER. Yes, sir.

Senator MILLIKIN. One of the reasons that give a powerful incentive to Federal projects is that you cannot reach agreement between a large number of States, particularly if you are talking about a river basin.

Mr. BROWER. There would also accumulate, in the 44-year period, a sinking fund of $94 million, the residue of which, after deduction for plant rehabilitation, could be available for irrigation payout. Moreover, a possible additional saving in fuel cost would nearly double the profit.

There is abundant coal in the upper basin. Just 10 percent of these reserves would produce power at this rate for 48,000 years, in the course of which an Echo Park Reservoir would have filled with silt 75 times.

And in addition to all this saving, we'd have also saved an important national park.

ATOMIC POWER

The prospects for nuclear power are little short of astounding, and seem to become more so every day. The Washington Post for February 28 carried a significant editorial and a significant news item. The editorial is entitled, "Nuclear Power in Britain" and says in part:

> The British Government's announcement that it is launching a 10-year plan for building electric-power stations to be run by nuclear energy is aptly described by Geoffrey Lloyd, Minister of Fuel and Power, as "historic." If the program is successful it may mean more to the country than any other industrial development of this generation.
>
> * * * The program, which calls for the building of 12 nuclear-power stations, will cost in the neighborhood of $840 million. The amount of electricity produced will be equal to that from 5 to 6 million tons of coal a year—hardly enough to keep up with the normal increase in requirements for electricity but at least enough to take some of the pressure for increased production off the coal industry.

Senator MILLIKIN. Your first step is to start out with a substitution of coal for power, and now you suggest nuclear power?

Mr. BROWER. I am suggesting these two.

Senator MILLIKIN. How does it lead to the regulation of the river?

Mr. BROWER. The regulation of the river, as I have tried to indicate before, so far as the holdover storage is concerned, is not necessary now. It will become necessary. When it becomes necessary, if the Bureau plans for the entire basin and not just the upper basin, not, mind you, to lose any of the water the upper basin is entitled to, they will not need all the storage they contemplate. If they pull out the power increment of this project, they will not need nearly so much river regulation as they now propose. So they will have a smaller bill to pay, whoever pays it. I am not suggesting that private indus-

try try to pay it, nor am I suggesting that the Federal Government should not. I am suggesting that we should seek the most economical project, the best one for the entire basin and that we can then put money that is necessary for agricultural subsidies into the places where it looks as if the subsidies should go.

Senator MILLIKIN. You have not said who will pay it, or how.

Mr. BROWER. That money will come from taxes paid to the Federal Government and State governments on a partnership basis.

Senator MILLIKIN. So that the whole basis of the reclamation projects would have to be reworked before we could get at the regulation of the stream?

Mr. BROWER. It may come to that. I am not prepared to state.

Senator MILLIKIN. So if first we get tied up in the courts indefinitely by the litigation already in process and that which has been invited and then to stymie the thing further, we are now to put a whole new basis under the reclamation law by providing other ways of finding resources which the Congress may not approve; that certainly puts the climax on stymying the development of the Colorado River?

Mr. BROWER. Sir, I do not need to say this, but I make this as a point. It is thoroughly within the province of Congress to make a 100-percent subsidy for agriculture and the necessary development to get all the participating projects we are speaking of in Senate bill 500 to make the total appropriation and not worry about the 12-percent repayment if it seems to be good business. I do not see any point in the Federal Government's underwriting uneconomic hydroelectric power and that is what we are trying to show would happen here.

Senator MILLIKIN. I am interested in that part of your theses, but I am also interested in your alternative suggestions, which to my mind, would as effectively kill the development of the Colorado River as if the Colorado River disappeared.

Mr. BROWER. I do not think it ought to.

Senator MILLIKIN. Every suggestion made in here is not for the development of the Colorado River, but some kind of scheme, some kind of invention, to make it impossible to develop the Colorado River.

Mr. BROWER. Sir, I would like to point out that what I am trying to do and what we have tried to do for some years is to suggest alterations of the Bureau's plan that would make it more palatable to the country so that there could be some power instead of none. That is what we tried to do. We have made the suggestion that they remove the invasion of national parks. We tried to suggest that there are better ways that will waste less water in producing all the water that is going to the upper basin by altering this project.

Senator MILLIKIN. Let us see what your objections amount to. First, you assert the esthetic objection that the reservoir-covered canyon is not as attractive as a dry canyon, the purpose of which, if your suggestion were adhered to, would be to redesign the whole project. No. 2, you come up with an idea that the electrical power is not as economic furnished by waterfall as it would be to get electric power in other ways. Therefore, I might suggest half a dozen ways that you might also make money, but it would not have any connec-

tion with the upper Colorado River basin project. You come up with the suggestion that atomic power is coming along one of these days and that will put your coal mines out of business, that will put your water out of business. You must not do anything because of these speculative thoughts about the future, all of which comes to the original point that I made that every time a suggesion is made around here for developing the upper Colorado River Basin, it must not be developed. Whatever is developed must be developed in the lower Colorado.

Mr. BROWER. Sir, if that suggestion has been made, I certainly do not support that, but I would like to back up to the three points here.

Senator MILLIKIN. A note has been handed to me and I would like to read it. It says that Jess Johnson of the Atomic Energy Commission and Admiral Rickover had assured Senator Watkins that hydroelectric projects should continue to be built. Other areas in the world would need atomic power more than our western area. Of course, all the dope we have on atomic power is that it would be relatively expensive power, but it will be needed power where they do not have fuel of any other kind.

Mr. BROWER. I have comments on several other points, and I would like to include that. First, I do not believe that the project would have to be redesigned to eliminate Echo Park. It would have to be rescheduled and that was one of General Grant's counterproposals. I do believe it could be redesigned to eliminate Echo Park to save money and the park. I have tried to indicate here two possible savings, one of $200 million by using High Glen, and another of $150 million by substituting coal. That is a total of $350 million in savings. Rounded off, $50 million one way or the other, it is still a substantial saving and I think the Senate would be interested in at least considering this possible saving.

Senator MILLIKIN. The most that can be done is consideration of it, because, frankly, there is considerable confidence in the opinion of the Bureau of Reclamation and the Bureau of Reclamation does not coincide with your own. They are our engineers, we employ them as our engineers. Why should we turn our back on those people and pick up random comment from other services in private life? And they have built many projects, the largest in the world and we have confidence in them. I doubt very much, with great respect for you, when you sit at this table and sneer at the Bureau of Reclamation, that the Congress is going to turn its back on them; that is just whistling in the wind.

Mr. BROWER. That may be. I do not mean it to be a sneer in any sense at the Bureau of Reclamation. As they themselves believe, and have stated, error is human and the Bureau of Reclamation engineers are human and they have made errors and we have pointed out some of them.

Senator MILLIKIN. That is true. I remember your greatest engineer in California designed and supervised and built a dam on one of your rivers out there, and the dam went out.

Mr. BROWER. That is right. The San Francisquito Dam.

Senator MILLIKIN. Showing that they can make errors and they can make them in private life as well as public life.

Mr. BROWER. That is right. They have made errors in the Tacoma Narrows Bridge in Washington. I think the Reclamation engineers would be the last to say that their work should not be scrutinized.

Senator MILLIKIN. It should be scrutinized and I think knowledgeable engineers would be the last in the world, considering the history of the organization and what they have done—not in what they have done in the way of criticism, but what they have done in constructive work—the last to criticize the work of the Bureau of Reclamation. When the showdown comes, just mark my words, the Congress will put their reliance on the Bureau of Reclamation.

Mr. BROWER. I hope, sir, they will put their reliance on the Bureau, and also on their own creature, the Hoover Commission and its engineers, and also on the Engineers Joint Council which has raised serious questions on this project.

Senator MILLIKIN. All of these things will be considered, but I am stating that we have our own employees, the employees of Congress who have assembled a collection of experts to do this work. I am rather inclined to believe that they will get the predominant consideration.

Let me ask you, are you satisfied with the engineering that was done on the Central Valley project in California?

Mr. BROWER. There is a rather recent and alarming thing.

Senator MILLIKIN. Has that gone bad, too?

Mr. BROWER. That is a rather controversial subject.

Senator MILLIKIN. I would be interested in the appropriations for that project if it is going bad.

Mr. BROWER. Here is one thing that is troubling them and that is where the land has begun to subside. Where the Southern Pacific used to run uphill into Delhi it now runs downhill. It does not bother the Southern Pacific trains any, but it does the canals.

Senator MILLIKIN. Are you, or are you not, satisfied with the Bureau of Reclamation development of that project?

Mr. BROWER. I cannot comment on that project because I have not studied it with enough care, but I know there are various things that if we wanted to develop, we could raise some questions on that.

Senator MILLIKIN. I think you could bring a "worry wart" study on almost anything. You alarm me about the foundations of the Nation. I do not think there is anything that you could not come in with and make an inventive discourse on it. I assure you that that is an unwholesome viewpoint. The Bureau of Reclamation has competent engineers and they have the scalps at their belt to show their work. I am sorry to hear that a piece of land has subsided in the Central Valley project; that it casts some shadow on the Bureau of Reclamation.

Mr. BROWER. They did not make it go down, it was just an overmining of the water basin below it.

Senator MILLIKIN. You do not blame the Bureau of Reclamation for that?

Mr. BROWER. No.

Senator MILLIKIN. Then you are satisfied with the Bureau of Reclamation as far as the Central Valley is concerned?

Mr. BROWER. May I reserve judgment?

Senator MILLIKIN. You can reserve judgment just as I reserve judgment on all extraneous opinions.

I will ask you, Are you, or your organization, going to make as detailed a study of the Trinity project when it comes before the Congress?

Mr. BROWER. Our organization is in this upper Colorado project, sir, because it affects the national park system and the national wilderness and national wildlife reserve.

Senator MILLIKIN. You have made financial points, you have made points additional to the esthetic part of the project. How about the Trinity project?

Mr. BROWER. It does not invade the national park system, sir, and we have not had the incentive nor do we have the staff to go into all of these, but here is one that does invade the park system and that has led to geeting these figures.

Senator MILLIKIN. But you do seem to go outside of your State where you have to look the fartherest to find things to object to, all to the end point of blocking the development of the Colorado River?

Mr. BROWER. Sir, I do not believe that is correct. We go outside of our State in a good many cases. We have members all over the country.

Senator MILLIKIN. Why not take a look at the Trinity to find out whether it is fiscally sound and whether it is sound engineeringwise? I am not saying it is not, but why not take a look at your own projects that the Congress has supported and that some of the rest of us have supported, and show as much zeal about the taxpayers' money there as you show about it in the Upper Basin States.

Mr. BROWER. As a citizen, I shall. As a member of the Sierra club, I cannot go around the country trying to spot check.

Senator MILLIKIN. How about going around to the Sierra club and listing the projects near your home as well as far away from home.

Mr. BROWER. We have done that, sir.

Senator MILLIKIN. You are aware that there has been considerable worry about the loss of game and fish connected with the Trinity project? There is a subject right down your alley; that is something your organization is interested in.

Mr. BROWER. When the comes within our resources of people to study it, we shall be interested in it, and so far our attention has not been directed to it by our own members or by outside organizations. If it is, I assure you we will be just as critical of that, and any other.

Senator MILLIKIN. Will you make a note of that? I am as competent here to testify as you are. Make a note of it and see whether it should not enlist the remaining finances of your organization and go to work in California.

Mr. BROWER. We work a great deal there, sir.

Senator MILLIKIN. Your interest seems to be always centering where it will do some other State some harm and where it delays the proper development of the upper Colorado.

Mr. BROWER. Sir, our club—one example in its history which shows that it is perfectly willing to fight California as much as any other organization, is that it fought the State of California to make the State of California give back Yosemite Valley to the national park system. It fought the city of San Francisco, where it was born, on that point.

Senator MILLIKIN. It has fought plans for getting water from the Colorado River?

Mr. BROWER. So far it has had no occasion to.

Senator MILLIKIN. It has had no occasion to? Do you know there have been lawsuits on the subject, there have been hearings down here? There was not a day when you could not come in with an opinion. We might not agree with it but we would be glad to have it. So let me suggest that your club give some study to the general effect on conservation, wildlife, and scenic esthetics so far as the activities of your State is concerned in the develoment of the Colorado River and the relation of the amount of water that the State of California gets in relation to what other States get.

Mr. BROWER. We are not concerned with how much water the State of California gets from the Colorado River. I myself do not think it should have any more than it is entitled to and that is as far as I will go on that. As far as the Sierra Club's work in other parts of the country is concerned, we have been vitally interested in the Grand Teton National Park, protecting Jackson Hole there. We are interested in a proposed dam at Glacier View and we are very much concerned with the Olympic National Park. Wherever the national parks are, we are interested.

Senator MILLIKIN. You are interested in drying up of our resources; are you not?

Mr. BROWER. No, sir.

Senator MILLIKIN. You mean a lovely stream would be dried up and you would not be interest?

Mr. BROWER. I misunderstood your question. We certainly are.

Senator MILLIKIN. Give some thought to what streams would be dried up if you did not have regulatory reservoirs on the upper Colorado.

Mr. BROWER. I do not know of any that would be dried up right now.

Senator MILLIKIN. Did you gentlemen disagree with the establishment of Black Canyon Dam?

Mr. BROWER. No, sir; we did not. In the first place, it does not affect a national park, wilderness, or wildlife refuge. It was not a park of national consequence and it is not an area of economic and recreational use.

Senator MILLIKIN. I am told that you have had some very beautiful scenery before you had the Black Canyon developed.

Mr. BROWER. We do not propose, Senator Millikin, to protect scenery everywhere. We have not opposed a good many dams all around the country that do not affect the national parks and the wilderness. We would support these, at least tacitly, because we are not in a position to make detailed studies and support them in any other way. We have not opposed them and that has gone on around the country with our total approval.

Senator MILLIKIN. Let me suggest to you that the people of Colorado have a deep appreciation of good scenery whether in a monument or out of a monument. Many of them have come there because it is a State that has beautiful scenery and millions of visitors come there for that reason every year. We are not insensible to the cultural advantages which your organization professes to believe in.

Mr. BROWER. We do believe in them.

Senator MILLIKIN. How about letting the people of Colorado judge whether they think that particular Echo Park development is good or bad?

Mr. BROWER. I would rather not, sir. I think that the people of the Nation should decide, because it is a national monument.

Senator MILLIKIN. I do not say exclusive jurisdiction, I say take some account of the fact that the people who live closest by it, who are affected most by it, think that the development is all right.

Mr. BROWER. Let me say this, Senator Millikin. Because I was born in California and of course have no choice, my first allegiance is in California. My second choice is Colorado. I lived there in the course of the war and I was in the Tenth Mountain Division. We lived in Denver and Glenwood Springs. I know you have a beautiful State and I know that the people who are concerned with the scenery, barring a few notable exceptions, have not been as concerned as they might have been; and as a result a lot of your country is being cut up with jeeps running over it. We have done a lot of wrong administering in our own State.

Senator MILLIKIN. We have done some little improvement and I am glad to see that your second allegiance is to Colorado. I wish it were first. The point is, I think some fair consideration should be given to the people who are in that State who think that that project is all right. I think you might give some consideration to that.

Mr. BROWER. I only wish more of them would look at it because very few have so far and a lot of them are going to, and I would like to give them a chance.

Senator MILLIKIN. We have so many beautiful things to look at, so many chasms and canyons that are readily available. Not many of the people have been down to the bottom of the creekbed and perhaps that may make them less interested than if we did not have any and had to resort to that one place to see nature in the primeval state. There are some people who can imagine nature in the primeval state. I can go over here to the Mellon Art Gallery, not as often as I would like to go, but I get great esthetic thrill out of seeing what some fellow has done with a paintbrush. In some places he seems to have bettered nature. Some people would dispute that, but you can go right over here to the Mellon Museum and you can see some magnificent things.

The point I am getting at is, if this were the only place in the United States where you could look at the winding, tortuous river at the bottom of a chasm surrounded by high walls, maybe it should not be covered up. I say maybe. I come back to my first theory that perhaps the most important thing is that those people there, since there is no shortage of scenery, are entitled to eat something more substantial than mastodon bones.

Mr. BROWER. Sir, the mastodon, or dinosaur bones are not at issue, nor is the matter of the choice of water or scenery at issue. The water can be made available without Echo Park Dam.

Senator MILLIKIN. You are at a big difference of opinion with our own professional agency for determining that.

Mr. BROWER. That is right.

Senator MILLIKIN. And you are entitled to voice your opinion, but your opinion is not predominant, as you will find, I think, from the committee and the Senate.

Mr. BROWER. I hope not.

Senator ANDERSON. Proceed.

Mr. BROWER (reading):

> From 1965 onward the Government believes that all new power stations may depend upon nuclear energy; if all goes well the total nuclear-power station capacity by 1975 will be 10 to 15 million kilowatts—equivalent to the amount produced by 40 million tons of coal.
>
> Nuclear power thus is as important to the future growth of some highly industrialized nations as to some underdeveloped ones. * * *

The Post's editorial comment upon Britain's plan is followed by Darrell Garwood's story, in the same issue of the paper, about an interview concerning progress in the same field in the United States. Because so much of this material is highly classified, it is difficult for all of us to know as much about it as we'd like to guide our thinking about the future of our country's energy requirements. What the Post story reveals is of tremendous importance to plans for upper basin water and mineral development; it reads in part:

> W. KeKnneth Davis, newly appointed director of the Atomic Energy Commission Reactor Division, said yesterday that before 1960 United States private industry could complete the most advanced type of power station—the kind that will produce more atomic fuel than it burns.
>
> A British white paper issued last week allows no possibility for this type of atomic generator until about 1970. The first 5 years of British construction will be allocated to a kind of reactor which United States atom builders have already decided to bypass.
>
> Davis' statement was the first indication the AEC considers the time ripe to start full-scale construction of the so-called breeder, a chain reactor that will more than replace its own fuel while turning out huge quantities of heat for the generation of steam and electricity.
>
> A small-scale pilot model of the breeder, first atomic device of any kind to produce electricity experimentally, has been operating successfully since 1951 at Arco, Idaho, and a medium-scale model is scheduled for completion in 1958.
>
> Davis said it is not necessary to wait for completion of the latter before going ahead with plans for a full-scale plant—that the project could start now and be completed in 4 or 5 years.
>
> Detroit Edison Co., 1 of more than 50 large firms studying atomic construction, has indicated a willingness to build the first commercial breeder.
>
> Consolidated Edison has announced plans to build in New York the first privately financed, full-scale converter—a type that produces some new atomic fuel, but not more than it consumes.
>
> The British, in outlining plans for 12 large atomic power stations to cost $840 million, said the first 4 stations to be completed in 1960 and 1961 will be gas cooled, and 4 more, to be completed in 1963 and 1964, might be liquid cooled * * *.

Senator ANDERSON. I only want to put a footnote there and say that it is too bad that the hearings which the Joint Committee on Atomic Energy has been conducting and which were completed on Thursday could not have entered perhaps more heavily into this discussion because there is not quite the same certainty among them that there is in these various statements. Much of it, of course, is classified, but I do not think this would be the answer. I asked one of the experts in executive session when he thought we could absolutely count on the breeder reactor being fully effective and he gave the range from 1 to 1,000 years. So, somewhere between 1 and 1,000 years is a possibility. We do have hopes and we are going ahead, but I would not, if I were you, be taken too far afield by the British figure of $840 million to put them in full-scale business. We have some $13 billion invested and we are not close to it, and I do not believe that their $840 million in a 10-year program is going to take them to the point where they are completely operating a breeder-type reactor.

Mr. BROWER. That program of $840 million will give practically 1½ times the power production of the entire Colorado storage project.

Senator MILLIKIN. If it does.

Mr. BROWER. If it works.

Senator ANDERSON. If it works. Of course, there is a wholly different reason than we have perhaps, because Britain has reached the point where coal mining is tremendously expensive. You cannot depend upon the current British mines to produce electric current as low as 3 mills and yet we do have in steam plants connected with coal the possibility in certain specified areas of developing very low current. However, it would not be safe to take a 3-mill figure that you can use in a perfectly located situation and try to say we can do that across the country. Therefore, I do not think these things are as absolutely sure as some of these statements and I did not quite read Ken Davis' statement in the way you did. I do not believe he was absolutely positive that we would have this by 1960.

Mr. BROWER. I did not hear him make this statement, it was just as it was reported in the Washington Post. I did read a statement he had made last fall in which he stated that in a maximum of 20 years, in a minimum of 10, atomic power would be competitive with steam power and he said, "By competitive, I mean with the best steam power." That is a conservative estimate. I think he is naturally conservative, and when he says a minimum of 10 and a maximum of 20, you might be able to slide the whole thing down a bit, but let us slide it up, if you want to. That is all going to have some important bearing on the pay out of what is now proposed, I think.

Senator ANDERSON. I would only say that there are a great many people who have carefully examined this problem and have not come out with this same conclusion. If the art continues to develop as it has been developing, that is probably true, but you have a problem connected with waste material. You have a great many problems that I do not dare go into without somebody from the Atomic Energy Commission pulling my coat sleeve when I get into deep water. I assure you I have not heard anything that makes it quite specific. I believe it is coming.

Mr. BROWER. I think for this reason it is important that when Mr. Hafstad left to become nuclear adviser to the Chase National Bank, I do not think the Chase National Bank would want to go too far into the future because they are dealing with dollars.

Senator ANDERSON. I think they paid Hafstad half a million. We were only able to pay him a few thousand dollars because of the popular opinion of scientists that we have heard expressed here today—that as long as they work for the Government that is all they are worth, but as soon as they step out and work for the Chase National Bank they are purified and made reliable. But Mr. Hafstad has gone up to the Chase National Bank and he will undoubtedly be very valuable to them because the Chase National Bank has to say, "What does this development mean to our customers?" In comes a man to whom they are lending millions of dollars. Would the development of nuclear power change the circumstances of that loan? The fact that he has gone there merely means to me that they want to keep in close touch with the situation and not that they are completely convinced that it is right around the corner.

Senator MILLIKIN. As I understand, Mr. Chairman, they still are loaning money on conventional methods of making power.

Senator ANDERSON. They are loaning money on conventional methods of making power and are still loaning millions of dollars to the Chrysler Corp. for the development of gasoline engines, even though, as you read newspaper articles, you can envision taking a piece of fuel about the size of an egg and running your car or truck across the country for as many miles as you want to run it. Theoretically, that is fine, but, actually, they do loan money on gasoline trucks and diesels just the same.

Mr. BROWER. I think they might be pretty chary of loaning money on a hydroelectric project in the arid region that is to pay out in 50 years.

Senator ANDERSON. I do not expect to be alive in 50 years, so I could guess with absolute freedom, but there are many people who will never concede that nuclear power is going to supplant power from falling water.

Mr. BROWER. I agree with you in a region where there is lots of water, not where the water is the primary resource, as in my second State, and in my third State of New Mexico.

SUMMARY

I have attempted to review for you some important aspects of a critical part of the Bureau's plans—Glen Canyon Dam and its effects upon Rainbow Bridge National Monument, a unique if small part of our national-park system. Uncertainties here are potentially capable of bringing about a repetition of the Missouri Basin troubles, where the Bureau's original estimate is now almost quadrupled.

Further, I have raised questions about what the Bureau's emphasis on building the Colorado project for power revenue may mean to the upper basin's irreplaceable resource—water. A look at alternate sources of power suggests that, for all the Bureau's skilled labors, it has in the inevitable course of progress come up with a 1950 model that will be way out of date long before it goes into production and may stand not the slightest chance of paying for itself.

If the Bureau can prove what it has never proved—that it is entitled to build all this extra storage capacity in order to produce power and the hoped-for power revenue—if in the face of the fact that alternative sources of power—coal, oil shale, natural gas, uranium, solar energy—will bring greater gains to the upper basin economy, the Bureau still feels it must have its plus or minus 48 million acre-feet of storage space, then let that extra storage be at the best site. A high Glen Canyon Dam, with adequate protection for Rainbow Bridge, would have these attributes:

It probably loses least irreplaceable water by evaporation.

It is only 5 percent higher than low Glen, and might cost up to $200 million less than Echo Park and Split Mountain Dams.

It concentrates storage where the Bureau planned to concentrate it anyway.

The power capacity is 400 percent greater than Echo Park Dam, and the production cost per mill about 40 percent lower.

It regulates the Colorado's main stem if that is necessary.

Bear in mind that the Bureau has not proved that any Glen Canyon Dam is necessary. And there is serious doubt that the people can

have their replaceable hydropower and get all their irreplaceable water too.

After so many years of planning why do we arrive at such a predicament? Because men are still human, and can make lots of mistakes. And because the Bureau's projects are becoming so complicated that no one but the Bureau has time to review them as they must be reviewed, and the Bureau is naturally inclined to like what it does.

I haven't talked much about parks this time. I tried to cover Dinosaur and its value to our national park system last year, in several pages of testimony before the Senate and House Subcommittees on Irrigation and Reclamation. What we assembled to tell our story pictorially last year is before you in the committee files and is entitled "Hetch Hetchy—Once Is Too Often."

Senator MILLIKIN. What is that?

Mr. BROWER. This is it: "Hetch Hetchy—Once Is Too Often."

Senator MILLIKIN. I have no doubt that when we come to the debate of this bill, California will come with the nicest assemblage of literature anyone ever saw. I remember when we had the Mexican Water Treaty up we could not get close to our desks because of the brochures of this kind.

Mr. BROWER. I hope you will read its text carefully and study the pictures which are eloquent.

Senator MILLIKIN. I shall read it.

Mr. BROWER. We still mean every word we say therein, and we know what we're talking about when we discuss Dinosaur's park values. The proposed Dinosaur dams the Colorado storage project now entails would unquestionably destroy the park values of Dinosaur. The National Park Service has said as much, and so has the country's foremost park-landscape architect. Having been down those river canyons myself, I know it in my bones.

Destruction for what?

Suppose you authorized Echo Park Dam and it was built.

Would that solve upper basin power needs? Of course not. According to the Bureau's testimony last Monday, the upper basin will need 150,000 kilowatts of new installed capacity each year. That sounds a little high; but taking the Bureau's figure, Echo Park's proposed 200,000 installed kilowatts would satisfy expansion needs for just 16 months. Then the upper basin would have to look somewhere else. There would be no more Echo Parks. Let's look for the full solution first, and save a park!

Would Echo Park Dam solve water needs? No. The upper basin can gets its holdover storage elsewhere with less loss of water. And when in 50–75 years the upper basin has all its share of water staked out, what then? There will be water enough to take care of the thirst of some 30 million more people, but not many more unless they cut down on their use. Water enough, yes. But parks enough?

I was in Yellowstone last summer. Gentlemen, we didn't have enough parks last year, let alone enough for half the new people the upper basin has water for.

There's a better solution. There are no more beautiful parks like Dinosaur where it came from—this we know. Dinosaur uses no water, and there's the equivalent of its power all over the upper basin. What you decide here is going to make a great deal of difference 100 years from now about the beauty of this land then. As Dinosaur goes, so

goes the national park system and if we ever let it slip from our grasp, we'll never find another one.

Senator MILLIKIN. I think that is a very far-fetched piece of analysis, "As Dinosaur goes, so goes the national park system." How do you figure that?

Mr. BROWER. That, sir—I believe there can be a very good point made on that and I think some of the other witnesses will speak to that. But not since Hetch Hetchy has there been an invasion of a national park by a dam.

Senator MILLIKIN. But you know when the legal documents were framed setting aside this withdrawal for the purposes you mentioned the possible future use for the location of water power was all in mind?

Mr. BROWER. The possible location at Brown's Park, the northern tip of the monument, where it was very specific that that was all that was permitted. That is a point that will be discussed later and I think entirely apart from whether it is discussed or not, Dinosaur is one of the outstanding units of our national park system. This, I know because I have seen a good many of them. This is an outstanding member of our national park system family. It is sort of a poor cousin in the monument status.

Senator ANDERSON. How do you feel about the situation in Alaska, if I may switch the subject a bit? We have reservations covering a great deal of Alaska. I have been trying to help statehood in Alaska. It can never be achieved as long as these reservations stand there. I have heretofore tried to aid legislation that would be rather liberal toward the conservation side and rather liberal toward the national parks and monuments and reservations of additional land that might someday be taken out from those, but for the present might be administered by the Park Service and regarded as reservation. Do you think if we try to get statehood for Alaska, try to tie those all down for national parks, which means of course, leave Alaska a territory, or do we realize that it might be desirable, beautiful as Alaska is, to take a few of these places?

Mr. BROWER. I think those places that are now in the national park system Congress should continue the best protection it can and that has been awfully good protection. Nothing has slipped through really since 1916; that is all we hope for. There are going to be these periodic requests to use a park for something else or, as Mr. Jacobson said, not to padlock our natural heritage.

Senator ANDERSON. Let us get to Mount McKinley Park in Alaska. I assume your club is very much interested in the preservation of that?

Mr. BROWER. We are.

Senator ANDERSON. I have been opposed to it.

Mr. BROWER. I am sorry to hear that.

Senator ANDERSON. It is because I love the parks.

Mr. BROWER. That is a paradox to me.

Senator ANDERSON. I only say that because some of you people know that I have for a long time believed pretty strongly in conservation and have been a reasonably stanch defender of the parks. I do not remember seeing anybody from any of these organizations, and I know by inadvertence, perhaps, when the Gila monument was dedicated down there last summer I was asked to come down and say a few words. I flew, in the worst possible weather, landed on a cow pasture in a single-motor plane when some other people connected

with official Washington would not even go down because the day was so bad, but I wanted to keep faith with the early conservation measure with which I had identified myself as a youngster. When they had a hearing on whether they should or should not dispose of Gila wilderness, only one man in public life came down and took a position. I think I was that individual.

Mr. BROWER. I remember that speech.

Senator ANDERSON. I am not saying that I am wedded to Echo Park. I have been hoping that we could work out something that might in some way relieve this situation, but I am absolutely and unalterably opposed to the theory that because in an early day a piece of ground was put aside as a national park or national monument it may not thereafter, in view of later experience or later exploration, be altered. In Mount McKinley National Park there is an area that contains the only good cement deposits that I know anything of in Alaska. The cost of construction in Alaska is inordinately high because the cement must be brought up from the States. The cement people are successful thus far in holding the park enthusiasts strongly behind the idea of keeping Mount McKinley Park as it is. There is nothing beautiful about the little section of Mount McKinley National Park where the cement is located. I have been over it, and I hope sometime you may go over it and if you can tell me what it contributes as far as the national park is concerned, I would like to know.

I believe the friends of parks, people who love parks and who want to preserve them ought realistically go to Alaska, survey Mount McKinley and say, "This much is good. This much is irreplaceable and this must never be touched, but the rest of it is not sacred." I am thinking of the time when I had proposed construction of a dam on the Rio Grande. I was not motivated by any personal interest. I was trying to carry out what the conservancy people had thought was desirable. We proposed this dam. I was then in the House of Representatives and was on the Indian Affairs Committee many years ago. When the testimony was taken from the Indians, Indian after Indian got up and said, "You must not build this dam. This ground is sacred." I finally went to John Collier, who is not normally in agreement with me, and I said, "Mr. Collier, would you mind taking the stand and testifying on this question on the sacredness of all ground?" I asked him if every inch of the whole North American Continent in the religion of certain Indians was not sacred, and he had to admit that it was. "Is not the entire area of northern New Mexico sacred, all of it?" He said, "Yes; it is."

So, if you apply that test of sacredness, there could never have been anything except the original fringe where Columbus might have landed, but that would be very little. Then we asked the question: Are there degrees of sacredness? The Indians admitted there were degrees of sacredness.

Mr. BROWER. The first touch of zoning.

Senator ANDERSON. Maybe you think so. When we got down to the question of whether or not any burial grounds were involved in this, or whether this were the sacred mountain to which the Navajo went, and found it did not involve any of those things at all and the Indians gave agreement that there might be borings made for dams there.

Now, I think the same thing would apply to Mount McKinley National Park. I do not want to say about this, because I have not been in this. It involves a lot of rough area and I have a peculiar condition in my pumping system that does not allow too much of that kind of travel, but I know in Mount McKinley Park there are miles and miles of area that the most enthusiastic park men I ever met would not say belonged in a national park, and it is because organizations like yours say that you can never disturb the boundaries of a national park once established, that these problems arise. Here was a piece of ground where a reservation was made for this particular purpose. You do not want to respect that reservation, but you believe that reservations for parks must be respected.

Mr. BROWER. One is a one-way reservation and the other is not. If you do not touch it for the dam, it is still there as a dam site in all perpetuity and you will reserve judgment for future generations to decide. If, however, it is touched, there is no park for perpetuity, it is gone forever; that is one of the points we try to make pretty regularly.

Senator ANDERSON. Do you contend there is any similar ground in the Grand Canyon National Park?

Mr. BROWER. Similar?

Senator ANDERSON. This ground has an agreement on it that it may be used for a dam site.

Mr. BROWER. Not that ground, sir; no, sir; that, we protest, or contest.

Senator ANDERSON. Will you admit there was any ground in and around the Dinosaur National Monument that was reserved for dam purposes?

Mr. BROWER. Brown's Park at the northern tip, where the dam would flood at the most about a mile of canyon.

Senator ANDERSON. If this were to be built at Brown's Canyon.

Mr. BROWER. We would not like it.

Senator ANDERSON. You would not like it?

Mr. BROWER. It would destroy the entrance at the gates of Lodore.

Senator ANDERSON. So that even if they went to the very spot that was reserved, you would not approve of it.

Mr. BROWER. That is a hypothetical question. I would like to see what they propose to do and then pass judgment at that time.

Senator ANDERSON. Actually, it is not hypothetical, because you are just as vigorously against this?

Mr. BROWER. We might be just as vigorous against it as we are here.

Senator ANDERSON. Do you feel that every inch of Dinosaur National Monument is sacred, even that which is reserved?

Mr. BROWER. I would say that every inch of the ground is sacred in a philosophical sense of the ground, the soil and the life it produces. We have been rather rough with that which is sacred in that sense. So far as our development is concerned: no. I speak of zoning. There are areas where we grow crops, there are areas where we pave. We paved more of this country than we have in parks and monuments. You might see that they just keep even. We have vast areas developed in reservoirs. We will have 700 miles of reservoirs in the Colorado system if this plan goes in.

Senator ANDERSON. Do you regard that as undesirable?

Mr. BROWER. No. I do not regard the major part of that as undesirable, but we do regard the invasion of the parks as undesirable

until the national defense, or something vital to the Nation requires it and not until then, simply because that is in a plan and "we do not want to change our plan, and we have to stick with it."

Senator ANDERSON. I think that I shall say that the spot where I seem to part company with you is this: I have been hopeful, there has been no secret about my hope, that there might be a plan developed which would not disturb the people interested in the preservation of the national parks and national monuments.

Mr. BROWER. Good.

Senator ANDERSON. I have said that publicly, privately, and every other way, and if somebody is able to show that is a better program than the present program, I would naturally like to be for it. But, if it does not develop, then I do believe that a commitment having been given for development in this area might not be as harmful to the rest of the parks as you seem to fear. I do not believe that using this as a precedent could go into the Yosemite and start damming there.

Mr. BROWER. That is the question I got started on and then we had an excursion. But at any rate, there are a good many people in this country who think that this is the gravest threat to the park system since it was created. There are a good many of them. We have felt that for about 4 years. We have marshaled all our conservation resources in this country to point that out. If, when we do that on a major issue, you, Congress, says, "Never mind, this is not important," then what can we do on the other issues that come afterward?

Senator ANDERSON. It shows that the Congress has the right of independent judgment, one of the most priceless treasures in the world. Regardless of how much pressure there may come from groups, if the Congress is not persuaded that that is an entering wedge, then the Congress has the right to do otherwise. I wish I had a better memory so that I could quote you what Edmund Burke said about members of a congressional body, but it is to the effect that your representative owes you not only his industry, but his judgment and he betrays you and is not serving you when he sacrifices you to that. It is a pretty rough way of looking at that perhaps, but not always do the individuals who sign petitions possess the same information that is presented to the Congress.

I say to you in all seriousness that a dam could be put in at Echo Park and not in the slightest threaten the Yosemite, Grand Teton, or anything else, because the circumstances are completely different.

Mr. BROWER. I would certainly believe that in the context of this time we are living in; that is, during your lifetime, as long as you had any influence, you would urge that that happen, and so would Senator Millikin. But suppose it has been done, and here come those who follow you in a position of grave responsibility and they say, "This is what they did. It has been done and we are only doing what has been done," and there it goes.

Senator ANDERSON. I have great faith in the men who follow Senator Millikin and me, that they will have more judgment than I have and almost as much as he has.

Mr. BROWER. I would like to add one statement here. Last year, Senator Watkins liked something I said here about leaving these places beautiful if we could, but also he had looked up something in

the Bible, and it said something about "Multiply and subdue the earth." I looked that up in my Bible and I have not found it yet, but I did find one other "multiply" which may be relative here. It was in Isaiah. Isaiah finishes my statement. "Thou hast multiplied the nation and not increased the joy."

Senator ANDERSON. I am glad you found comfort in that. I was being taken over the coals by some people in responsibility and after going home I read the Bible and found, "Remember, Lord, how I bear in my bosom the reproaches of all the people."

When we try to pass these things, we realize how the Members of Congress have to bear in their bosoms all the reproaches.

Mr. BROWER. Thank you for this opportunity.

STATEMENT OF SIGURD F. OLSON, PRESIDENT, NATIONAL PARKS ASSOCIATION

Mr. OLSON. I represent the National Parks Association. We are pledged to defend from exploitation or change all the areas comprised in the national park system. We believe that if any integral part of this system is destroyed or injured, all other parts are threatened. We are convinced that Congress when it established the National Park Service to administer the areas concerned meant what it said, that these areas should be passed on unimpaired.

These angles have been covered before by previous speakers, but I merely repeat them because they are what the National Park Service believes and they are the premises upon which we stand and will continue to stand.

We also believe that these areas are for the education and spiritual rejuvenation of all the people, and that the task of protecting them is for these purposes. We feel that the protection of any places of unspoiled nature has a greater spiritual significance than any other, and that any change in these areas which depreciates the spiritual values is wrong.

What are spiritual values? How do they differ from others? It is a simple question to answer. Spiritual values are those which affect the emotions, which make us feel deeply, which contribute to our happiness.

"Thy rocks and rills, thy woods and templed hills"—what do those lines do to you? They make you want to weep or cheer. Why? Because they bring to mind a vision of the America that was.

Do these lines fill you with excitement and the wish to do violence? No; they fill you with peace and inward joy. That is what we mean when we talk about spiritual values and the real purpose of our national parks and monuments.

I realize the importance of evaporation statistics, kilowatt-hours, irrigation, concrete and steel, not to mention the many millions and possibly billions of dollars involved. These too are questions to be considered; but it seems to me the basic reason for our concern about Echo Park Dam has to do with the intangible or spiritual values and what their loss will mean to the American people. We believe that if Dinosaur National Monument is desecrated certain values will be lost forever, values that are far more important than values of power.

We have come a long way in the past 400 years, have criss-crossed our broad land with highways, railroads, powerlines; spotted it with

cities and towns; have placed under management and cultivation most of the arable land. We have done our job of subduing the old wilderness so well that there is little of it left—less than 1 percent of our land set aside in our national park system so that the future can see what our old continent was like. We have become so imbued with the pioneer concept of utilizing every acre of soil that we try even now to subdue and change what little is left.

James Fenimore Cooper, in The Prairie, said:

> When the Yankee choppers have hacked their way from the Atlantic to the Pacific, they will turn in their tracks like a fox doubling back, and be appalled at the waste and destruction they have caused.

Even then he saw what was happening, and he would be still more appalled if he could see the continent today.

Our culture has changed, too, and the best evidence of its slow development from a physical conquering pioneer breed to one of appreciation for the arts and the better things of life is the setting aside of preserves which one may call sanctuaries of the spirit, places where men can find release from the tensions and pressures of a machine age.

The historian Trevelyan said:

> Any nation not concerned with preservation of the natural scene is doomed to brutishness.

He recognized the signs in England, and he would have recognized them here and deplored the attempts to destroy any areas that have been set aside or undo the cultural advances of former years.

I sometimes wonder where our much-vaunted industrial civilization is leading us; if our country is going to become a sprawling industrial network that will engulf our quiet little villages; if all the land is going to be used up; if the population is going to go beyond the 200 million predicted for 1975; and eventually reach a point where there is standing room only and no longer any places of quiet and peace. I wonder what is going to happen to what we feel is the good life and what has been the good life for several centuries, a life in a country where there was room and breathing space, where a man and his family could enjoy the earth, its smells and sounds and the feel of it. I wonder in our mad rush to dam every river, chop down every tree, utilize all resources to the ultimate limit, if we might not destroy the very things that have made life in America worth cherishing and defending?

Dinosaur National Monument and the threat confronting it is a symptom of an era and a way of looking at the earth and its resources. It is also indicative of a way of life that is all speed and confusion and noise, where the so-called material values have become more imporant than the spirtual. Much has been said about the hypothetical recreational values that will be developed should Echo Park Dam be built, a hundred miles or so of placid lake, over which could cruise speedboats and cabin cruisers. Little has been said about the effects of the drawdown, the desolate sinking flats and ruined shorelines that always accompany fluctuating levels. Little has been said about the violent change in atmosphere that would result if the magnificent canyons were filled with an artificial lake and the precipitous walls or what remained of them echoed constantly to the roar of high-powered watercraft.

A whole philosophy is endangered by this one act, an emerging concept of regard for the beauties of a primitive scene, a realization that there are certain benefits that are beyond price or practical consideration. More and more people have come to believe this issue is far more important than just an argument over power potential, that actually it is a challenge, which, if not met, may destroy the very basis of the good life in America.

The founders of the national park system would be shocked to realize what is proposed in 1955, the most serious and threatening attack yet launched against these great reservations. Should Echo Park Dam be built, it will serve as a precedent that may well make it possible to construct other dams in the Grand Canyon, in Kings Canyon, Yosemite, Glacier, and Mammoth Cave National Parks and others. Let no one think this danger is not real, for many of the projects have progressed beyond the blueprint stage and need only a precedent to set the new pattern for them. If Echo Park Dam is built, or any other, the sancity of the entire national park system will be endangered. That is the real significance of the proposal.

The National Parks Association, with all other conservation groups, are in favor of a sound water-development program for the upper Colorado which will conserve the water of this great basin and make an equitable distribution to the States concerned; but they believe sincerely that such a program need not violate any national park or monument, and that alternative methods of security the desired results make the proposed violation absolutely unnecessary.

We have heard a great deal of talk of acre-feet, power potential, irrigation, storage, concrete and steel, and money values. As I have listened to these presentations and to others, I wonder if we are not sitting in judgment on something far greater than we realize.

The real values back of our opposition to Dinosaur National Monument construction are the spiritual values that really concern the people. I called a conference in New York on November 17 to which conservation groups from all over the Nation came. We met to discuss what to do about Dinosaur and crystallize our own thinking and we arrived at what we thought was a very fair conclusion which was broadcast through the Nation by the press that we were not opposed to a sound water-development program for the upper Colorado, realizing the great need of water for the area concerned. But that we were opposed to any invasion of any national park or monument in the development of this program.

I think that makes our position very clear. It has been stated before. We are not against water storage; we are not against a sound program. We agree with you, Senator, when you said—and I was glad to hear you say it—that you were in favor of any program, if it could be worked out, that would not violate the monument.

That was very encouraging to us. We feel that a solution can be worked out that will give the West the water it needs, that will take care of the various problems raised by you and the other Senators, but that it need not be done by violating the monument.

I travel all over the country, I meet people everywhere who are concerned about Dinosaur. By and large they are people who know nothing about the factors that we have been discussing today. They wouldn't know an acre-foot from a dinosaur track. They don't know

the details and technical considerations but they know one thing, and that is the thing on which their decision is based, and that is that the National Park Service system is a sacred system, that the spiritual values involved there are values that they understand and that are big enough for them to fight for.

These spiritual values may be brushed off by engineers and others, but they are pretty important values. They are the values that give purpose to almost every practical thing we do. They are the values back of this whole national opposition to this program.

To try to explain spiritual values, I saw a movie last night, a premiere of a movie being made for the National Park Service by Charles Eggert, here in the audience, the Lincoln Memorial. It is in the rough as yet but he has some beautiful shots of that memorial. I have seen it many times. I have been there at night alone to get the feel, but his night shots of various angles of Lincoln's face catching pathos and tragedy of it is of great significance.

Senator ANDERSON. That monument disturbed the natural scene.

Mr. OLSON. Maybe it did, but maybe it added something here in the city.

The music back of the movie, the old Civil War songs, Hallelujah, Tenting on the Old Camp Ground, Dixie, the background of drums, I was deeply stirred watching that thing and thinking about my testimony today. I said to myself, there were spiritual values. Now, translating the Dinosaur Canyon into spiritual values it is pretty hard to say how everyone feels but anyone standing on the rim and looking down in that canyon or anyone standing, say, at the rim of Crater Lake or at a lookout where they can see Yosemite Falls or Yellowstone or any of the others, they catch something, something without price that you can't put down in kilowatt-hours or figures. Those things are what we are fighting for. They are the values that are incorporated in the national park system. They are the values that are in danger of being destroyed.

We have come a long way in the last 400 years. We have heard a lot of talk today about our program and what it has meant. Anyone who is familiar with the history of our advance from the Atlantic to the Pacific knows what has happened. We have crisscrossed the country with highways and railroads, and even the air now with air trails. Towns and cities spot every place. As I flew over it the other day I couldn't help but think there is very little place left that isn't crisscrossed and checkerboarded with developments of some kind or another.

We have been so successful that in the past 2 centuries, or 1 century we might say, we have subdued the wilderness that we set out to subdue and have set aside less than 1 percent of our area as an example of what America used to be. That isn't very much.

I read a statement of James Fenimore Cooper the other day which I incorporated in my statement. That was written a long time ago, but he saw the signs there, too. He said:

> When the Yankee choppers have hacked their way from the Atlantic to the Pacific, they will turn in their tracks and like a fox doubling back be appalled at the destruction and the waste they have caused.

He would be more appalled today. I wonder sometimes where we are going; if our industrial civilization is going to spread out

so far and so wide that all of our quiet little places, villages, towns, and woods, are going to disappear; if we are going to lose the very thing we call the good life in America—if as population experts predict, there will be 200 million by 1975, and God knows how many millions by the year 2000, there is just going to be standing room left—if there are going to be no places left where a man can view the primitive scene and recapture those spiritual values which we now think are important and worth fighting for.

I wonder. I think we all wonder, especially those of us who travel, what is happening.

Senator ANDERSON. When you speak about that, Mr. Olson, let me go back to my own State again, which was the first one of the primitive wilderness areas staked out.

Mr. OLSON. The Gila.

Senator ANDERSON. When the effort was made 3 or 4 years ago to dismember the Gila Wilderness was your organization represented there?

Mr. OLSON. Our executive secretary was there. I couldn't get there. I was over on another expedition.

Senator ANDERSON. The hearing at Silver City.

Mr. PACKARD. I did, sir, and I enjoyed your presentation.

Senator ANDERSON. Are you an official of the National Parks Association?

Mr. PACKARD. I am Executive Secretary Fred Packard.

Mr. OLSON. May I continue?

Senator ANDERSON. Yes.

Mr. OLSON. We have come through this period of rapid development carrying with us the old pioneer concept of exploitation. It was inevitable; we revere the pioneers. My folks were pioneers and so were yours, probably. We erect statues to them. They did the job that had to be done.

Senator ANDERSON. Mine were Swedish immigrants.

Mr. OLSON. So were mine, thank God.

This pioneer concept, however, is still more or less ruling us today in our handling of the remaining untouched areas we have. The original idea was to subdue every single acre, to chop down every tree if necessary. And today we still have that concept creeping out; it is not as predominant as it was, but we still feel we must chop down every tree that stands in our way; we must dam every stream; we must utilize somehow the last remaining bits of wild or natural areas there are. In the last half century, or I would say century, a new concept has been growing, a new philosophical concept for America. I want to talk about that briefly.

This concept is inevitable in any nation that has gone through the throes of youth and pioneering. It is a concept that comes when a nation develops some leisure and means and security. We have reached that stage. This new concept is one of nurturing the fine arts and what we choose to call the better things of life. It is one that does the amazing reversal of trying to reserve some of this wilderness that we fought for several centuries. We did that starting right after the Civil War. We crystalized it in 1916 and the very fact that Congress put into that organic act setting up the National Park Service, these areas must be passed on unimpaired—I believe Congress meant what

it said—indicates a cultural growth that is really amazing in a young country.

I think of what the historical Travelyan said in England when he was fighting for some natural preservations there in commenting on this; he said any nation not concerned with preservation of the natural scene is doomed to brutishness.

He meant it was a step backward to the early physical days when there was no time to regard natural or scenic areas.

As I look at Dinosaurs now and look at this effort that has been going on 4 or 5 years to preserve this unit of the national Park System; as I see the enormous interest of the people in our country to preserve it as an integral part; as I analyze the possible threats—and they have been covered by previous speakers—I realize that the danger is real and that the people of America realize that the danger is real.

The big question to me is not whether so many acre-feet of evaporation are involved or power potential. The question is whether we are taking a step backward in this emerging new philosophy of preserving natural areas of if we are going to take a step forward and consolidate our position.

I think if this dam is built that this year will be remembered by future generations as the year when the first entering wedge was put into this magnificent system of parks and monuments so that the others could also fall by the wayside. I think that the stakes are very high. I think they have to do with the good life in America and the opportunity for Americans to realize the significance of the natural scene.

We only have to look at the records of the national park service to see how interested Americans are. They say 47 million saw the national park areas last year. I question the figures, because I think they include the Washington Monument and other like areas. But in any case, the figures are tremendous. The national forests quoted some 30 million. A good segment of our population have seen and go to these wild areas. Why did they go? Not to collect stickers on their cars, to say "We have been to Yellowstone or Dinosaur," but because they could catch something there that they could not find in their immediate environments.

I think we have a tremendous responsibility here and I want it clearly understood that we are fighting for a principle, that we think we are right, and that we will continue to fight for this principle as long as there is any possible threat to any integral part of the national park system.

Thank you very much.

Senator ANDERSON. Thank you very much. It was a very sincere and fine statement. We appreciate it.

Mr. Smith.

STATEMENT OF SPENCER SMITH, FOREST CONSERVATION SOCIETY OF AMERICA

Mr. SMITH. I have no prepared statement. I am Spencer Smith, Forest Conservation Society of America. I might add a personal note just as a preface to my comments that at one time an economist coming into conservation organization was looked upon with some suspicion and some worry, but having been an economist both for the

Government and as a college professor, I am used to suspicions and difficulties surrounding that profession.

I should like to add that I have learned much from conservation organizations since I have been there. Our particular comments relative to Echo Park and the whole development of the upper and lower Colorado Basin, I should like to put in a kind of cast or framework with which I am used to working.

First, it would appear to me this is becoming more and more acute and this is precisely the alternative use of resources within our country.

Population experts are seemingly missing the boat, time and time again, with their projections. The reason they are missing they seem to be underestimating the population trends and each year we receive a new prediction and each year the 1960 projection grows larger and larger.

Now, obviously our resources within the country, our natural resources, cannot grow in any kind of proportion so therefore it is incumbent upon all of us to try to make some decision as to how we are going to use the resources we have available.

In that setting obviously the one element that is going to loom larger and larger, we have in this country increased our productivity at approximately between 4 and 5 percent or very close to it, during the war years it was a little greater than that.

Also over a period of time we have reduced the work we can to where we have 40 hours and there is some serious consideration to reducing it further.

Now with more people, more leisure time, greater amount of income, obviously recreation and the various values that Mr. Olson spoke so eloquently about are going to come in for more serious consideration. Certainly the upper Colorado project is one of these. May I say at the outset that the Forest Conservation Society is not opposing this particular project in its entirety. Our exception deals with Echo Park alone. We are not able within our limited resources to go into the details and techniques of engineering studies as to whether it is possible to actually achieve the kind of development that the people of the West want, certainly need, in terms of their future expansion and it appears economic expansion is going to come in that area to a very great extent.

We would not stand in their way and I personally in past years have been a strong advocate of multiple-purpose power units as a means of developing the West.

I am saying, however, that we are now running critically into the problem of alternative use when we have a situation like Echo Park.

The aesthetic hopes and fears perhaps have to be placed on the mantel for consideration by this body just as water use and another which has not been mentioned too directly, the mineral resource development of that particular area, because it would seem to me, perhaps as a source of income in future years.

This may be a strong governing factor in certain areas and may perhaps take precedence to certain extent over the water development.

The loss of Echo Park as far as recreational or natural habitat consideration means a great deal to many people. It means so much to so many people that that is one of the precise reasons so many are here before you and are writing and concerned about it.

In terms of evaluating the particular problem of Echo Park, I should say I think it is immediately relevant to point out some of the things I do not understand and perhaps by so doing this may throw or cause to be thrown a little clarity on the problem.

One is the design—it is a multiple-purpose operation to get at the problem of joint costs because most of the costs are joint in this instance and the various resources that are to be used are going to flow in many different directions, three primarily; one in terms of power for electrical energy presumably in terms of kilowatt-hours, the other for irrigation, and still the third for certain water storage.

Now as near as I can read without documenting that precise point, as near as I am able to read the report, Colorado River storage project of the 83d Congress, second session, thereby presented, it would appear to me that a cost of around 6.2 or 6.3, and not taking issue with these learned people who proposed it but to suggest even this may be optimistic since it is at the power site, I am concerned also with the possibilities of transmission costs which are estimated.

In Echo Park there is the problem of getting out of there. It is a lot easier to get into a place or down from a mountain where a project may be located into the various contiguous areas and to get out of a canyon. I note in this instance they have not particularly added any more outside costs for transmission which would be over the amount of the cost at the powerhead.

The other problem would seem to me that there is a 50-year amortization which is based in terms of this 50-year amortization of all the costs paid for from power revenue. Now, there is a deferment which I will talk about in a moment, a slight deferment of, I think, 44 years of certain irrigation projects.

I should like to point out that the cost as mentioned of 6.2 or 6.3 at a revenue possibility of 3 even, with total funds to be supplied out of power revenues for 50 years, does not seem to be self-supporting and self-liquidating on that basis.

The other thing that bothers me is 2½ percent bonds, later perhaps at 3 percent. These bonds can be issued on many bases. One is what is called an outside-sale bond, which might be very difficult to come by because that means you have to have a market for that bond at that rate of interest and it may be some indication to note that within the last 5 to 6 years there has been a movement up of long-term interest rates. I am not sure that bond issue will be readily available at 2½ percent.

Another thing the proponents suggest is that it may go to 3 percent, perhaps a little more. Each time this happens the amount of deferral on irrigation goes up tremendously. I haven't figured it out precisely, but the total cost would seem to be great.

Now, all of these items as far as I have listed them here I bring up a serious question as to about the finance and cost of the dam.

But I know cost is a relative term. Cost has responsibility and a basis only in what you are going to get after you incur the cost.

It seems to me we would have a right to inquire as by incurring these costs what kind of value added from the project we get.

Now I am aware of former Governor Miller's testimony in which he concerns himself about the irrigation cost being a subsequent difficult of around two to three thousand dollars an acre. My analysis leads

me to suggest it hasn't been seriously challenged to the best of my knowledge, as of this time.

Now two to three thousand dollars an acre may not necessarily be an overwhelming cost providing what it would add to the total acre and final valuation. As near as I can tell there is very little possibility of this going up to $200 or $250 an acre because of the products that result from it. Actually if you are going to use irrigation you are using it for some purpose. You don't just use irrigation to have more water. You can do that by more convenient methods of conveyance. You use irrigation to produce something. Apparently there will be grasslands, perhaps some forestation or perhaps some commodities. According to the latest report on regional economic analysis that I have of the two regions in question, Southwest and Northwest, they get a good bit of farm income from meat animals and of course a residual of a very small amount comes from feed grains which means their reliance on feed grains is to feed their livestock for market.

I suggest to you—and I am sure I will be questioned on this by the chairman, since I have heard him on television and many other instances—pardon me if I call you Mr. Secretary. I keep thinking of you in that term—but I am sure as far as his experience is concerned that perhaps beef growers in this particular part of the country—what I was going into primarily was to say that you want irrigation for a purpose. Just to convey water—you want irrigation for the purpose of refurbishing rangeland or to grow feed grains and what percentage the breakdown will actually be I don't know in terms of grasslands or in terms of other general rehabilitation or how much you want to build up the feed grains.

I was saying the best analysis I can get is on the reasonable economic evaluation by the Business Economics Department of the Department of Commerce, in terms of the income breakdown as to where it comes from—the Northwest section and Southwest section, Northwest section including Utah, Colorado, Wyoming, and to some extent Kansas, and Southwest: Arizona, New Mexico, and Texas.

As far as Southwest is concerned, the best of my knowledge is there is a greater amount of farm income that comes from livestock products than any other group. Therefore we presume the agricultural development upon which irrigation is going to rest is going to come from the development of feed grains or grassland on which to grow livestock.

The livestock breakdown I won't go into. I don't know if I have the exact figures available but it is going to go into beef and sheep predominantly. It is my judgment with this value added, about the total value per acre you will have after your irrigation will come up to $150 or $175 an acre. It is highly dubious that you are getting very much back for your money in terms of the subsidy, unless we see on the horizon and very quickly a considerably improved market for livestock.

Beef growers at the present time are faring a little better but not too much better than some of the depressed prices indicated as of last year and last 2 years.

Therefore, as far as beef is concerned, this would seem to be a high cost operation in producing.

Now, as far as feed grains are concerned, it would appear to me that you could actually take the subsidy—if you take that as a cost,

you could take corn at parity, put the freight on top of it, take it out and feed a good deal of cattle on feed at the present time in the Western States and you would still have a considerable saving. Now obviously the total irrigation or total project is not depending just on irrigation but we are suggesting that that part which must be borne by irrigation I think should be looked at with some care.

Now, obviously, the power situation is in a different category. This, it would seem to indicate, would make it more possible for development of industrial capacity in the West. I seriously question the figure as far as improved value as a result of irrigation on farmlands since what is produced in that area can't actually be justified.

As to the power or electric power, I have heard I think a rather full estimate. Whether I am in the minority as far as this committee is concerned, I am not sure but I was very much impressed with Mr. Brower's comments as far as alternative sites of power. I do suggest this: It would appear to me as far as the basis of power is concerned and that part that is allocated to the actual dam situation at Echo Park is of serious question as to whether this in and of itself will be able to carry and supplement that amount of power that appears to be deficient in the report or that will be needed by Glen Canyon Dam.

Under these circumstances I would say that further question is shown regarding it. I don't think our organization—I am sure conservation organizations at large are not interested in trying to prevent either the Colorado, upper and lower basins, or any other power development in the West as and of itself from being developed.

I think this perhaps preoccupation which is disturbing to some extent the preservation of national park areas and why we want to have a precedent rather than clearly established for these national park areas is to say when some alternative use for this area is proposed that the individuals who propose such alternative use are going to have to assume a reasonable and perhaps on occupations unreasonable burden of proof for the alternative use. I certainly cannot visualize posterity as to what it shall be nor the future a hundred years from now, or what the needs of our population will be. But I think part of the reason for Congress setting aside these areas if not for total perpetuity is to say any one who comes in here must certainly demonstrate beyond any reasonable doubt that this kind of violation is not only neecssary now, but is necessary in the future or ad infinitum.

It appears on this ground the development of the Colorado Basin with particular reference to Echo Park, finds an extreme burden of proof that has not been disseminated to the extent I would like to see it at this point.

Also I would certainly, if Mr. Brower's statements about heights of the dam, etc., are in question, I am not enough of an engineer to illuminate this committee as to whether the structure could stand or not, I would say that these proposals should certainly be looked at to a very extreme degree for this reason. It is something Mr. Olson said and I wish to emphasize. We have been called on occasions, among other things, obstructionists and that we are therefore somewhat reluctant to allow any program to go forward. I think it is something different. I think it is the fact that once something is done to one of these wilderness areas and we discover our error later it cannot be undone.

And if we are perhaps somewhat zealous in urging consideration of such things as alternative use and to attempt to stay the hand, if you will, of groups to go in and start developing this without the most ultracareful investigation, I feel this is our concern.

We certainly do not want to prohibit industrialization or development of the West. We do feel we have a very few areas left, about 1 percent, we feel that an increasing population with increased productivity that this is going to have would be one of the end uses of our resources that will have to stand in competition with all other uses and we feel one of the reasons why we cannot put out brush fires all over the world, we feel that if we have this particular section therefore there has to be a showing of cause for other alternative uses, and this I think is the basis of much of our concern.

Thank you very much.

Senator ANDERSON. Maybe I had better explain that one of the reasons I was a little disturbed by the seeming effort to challenge what the Bureau of Reclamation has done and try to show it in contradictory and almost dishonest positions was that I did spend a little time in a Federal department and found some wonderful people there. To me three of the finest services that we have had in this country are the Forest Service, Army Corps of Engineers, and Bureau of Reclamation.

I have defended, I did defend when Secretary of Agriculture, the Forest Service people against all comers.

Mr. SMITH. You did so very successfully.

Senator ANDERSON. I hate to see people put on the rack as I thought the Bureau of Reclamation was being put on the rack by the statement today.

Thank you very much, sir.

Now we will hear from Mr. Packard.

FURTHER STATEMENT OF FRED M. PACKARD, EXECUTIVE SECRETARY, NATIONAL PARKS ASSOCIATION

Mr. PACKARD. I am Fred M. Packard, executive secretary of the National Parks Association.

Other witnesses have discussed the importance of preserving Dinosaur National Monument and the national-park system as a whole from the disruptive impact of Echo Park Dam. I shall confine my statement to a few matters that have not been discussed thoroughly, to avoid repetition.

In November 1954 representatives of more than 20 national organizations met in New York, where they defined their common position. They agreed on the following statement of their objectives:

1. The national-park system, established by law, is urgently needed and is increasingly being enjoyed and supported by millions of people. The conservationists represent the public interest in the preservation of these areas. That is what brings us together in this crisis.

2. We are opposed to any legislation that would authorize building the proposed Echo Park Dam in the Dinosaur National Monument in northwestern Colorado and northeastern Utah—or any other dam that would flood any portion of any national park or monument.

3. We are mindful of the extreme importance of water in the West. And we are sincerely interested in any sound upper Colorado water development that can effectively utilize the water without threatening

the national-park system. We point out that the necessity for Echo Park Dam has never been demonstrated. It has only been asserted. We also point out that the alternatives to Echo Park Dam have never been adequately studied by the Bureau of Reclamation, and have never been proved inferior.

4. We invite all citizens to join with us to make sure that areas set aside for preservation in the National Park System are not needlessly invaded or destroyed.

Signed:

The American Museum of Natural History
The American Nature Association
The American Planning and Civic Association
The Conservation Department, Yale University
The Conservation Foundation
The Council of Conservationists
The Dartmouth Outdoor Club
The Emergency Conservation Committee
The Garden Club of America
The General Federation of Women's Clubs
The Izaac Walton League of America
The National Audubon Society
The National Conference of State Parks
The National Council of State Garden Clubs
The National Life Conservation Society
The National Parks Association
The National Wildlife Federation
The North American Wildlife Foundation
The Outdoor Writers Association of America
The Sierra Club
The Wilderness Society
The Wildlife Management Institute

There now exists a large volume of testimony describing the beauty of the magnificent canyons of the Green and Yampa Rivers in Dinosaur National Monument. Evidence of the unique quality of these canyons as outstanding scenic and scientific assets of the nation came from people qualified by professional and personal experience to judge park values.

At first, proponents of Echo Park Dam derided the importance of the area and asserted similar canyons could be found at many places in the vicinity. Currently, however, these proponents agree the canyons are extraordinary, and a publication of the upper Colorado River Commission this year describes them as "one of the greatest natural wilderness playgrounds and some of the most beautiful scenery in the world." It is to prevent destruction of this beauty that the conservation forces are opposing Echo Park Dam.

Reversing their attitude that the national monument contains nothing worth preserving, the proponents now urge its potentialities for public enjoyment be developed. There is agreement the monument should be made more easily available to the public, but differing views as to what form such developments should take. Today, in its undisturbed natural condition, Dinosaur National Monument possesses qualities of tranquil wilderness, providing unique benefits for release from the speed and tensions of mechanized civilization.

Its beauty is a treasure to be guarded. Until the present controversy developed, the area was little known, and no funds have been provided for service to visitors. In spite of this, more than 6,000 people visited it in 1942. In 1952, 12,000 people were recorded; in 1953, 23,000; and in 1954, more than 70,000, the greatest proportionate increase recorded in any national park system area. Last year, about 1,000 people made the boat trip down the rivers.

Use of the monument by increased numbers of visitors is dependent on preservation of the canyons in their natural state, for they are the principal attraction there. These canyons can contribute little or nothing to public enjoyment once they are flooded. Several usable roads lead to the bottoms of the canyons and to other places in the monument. They are passable, except in very bad weather, but do need improvement. The rapids are not hazardous, except possibly 1 or 2 stretches in the Green River, and these present no serious dangers to qualified boatmen. The master plans of the National Park Service call for appropriate lodging places, campgrounds, sanitation facilities, and other services for the public, which can be provided as soon as funds are made available by Congress. Establishment of such facilities is not dependent in any way on construction of the dam.

Proponents of the dam now urge the recreational possibilities be developed. But they would first destroy the principal assets for enjoyment, and substitute the artificial entertainment of a lake. In place of the unique, exhilarating river trip of today would be the speedboat and waterskiing, and little else. The reservoir would be bordered by a morass of mud and debris, since it is expected to be filled only once every 30 or 40 years, and the drawback at periods of low water would extend 25 miles on the Green River and 13 miles on the Yampa; 35,000 acres of ooze and stained shorelines, devoid of vegetation or other life, would render any recreational use virtually impossible.

Proponents of the project point to Lake Mead as their ideal for future conditions. They should take a closer look at their model. Lake Mead is the only body of water in thousands of square miles of desert. It flooded no features of special value. A large number of people are recorded annually at the area but most of them simply drive to Hoover Dam as an excursion from Las Vegas. Few actually use the lake itself for recreation. A recent report states that fewer than 1,000 people rented boats there in 1954. Lake Mead has been nearly filled once (1941) and present drawdown is more than 120 feet. Bacteria in the morass of silt has forced the closing of beaches, and these facilities are now isolated from the water by muck many feet deep, while boat wharves are being rendered unusable.

It is unlikely that recreational use of Echo Park Reservoir would ever amount to much, any more than the similar unattractiveness of the Hetch Hetchy Reservoir, its nearest counterpart, has any recreational use, but rather represents an unnecessary loss of those values.

Advocates of this project seem to be having extraordinary difficulty to find a valid reason to build Echo Park Dam. In 1950 the justification was that an important defense plant was to be located in the area. Some months later, the plant was relocated in another State. In 1954, Secretary McKay stated that no consideration would have been given to Echo Park Dam had he not been advised it would

prevent an excess evaporation loss so serious as to require its construction.

When the calculations on which this advice was based were proved and admitted to contain serious errors, and the amount of loss reduced to insignificance, that justification fell apart. Now, I am advised by one of the Assistant Commissioners of Reclamation, the reason Echo Park is needed is to firm up power produced at other sites. But no serious studies have been made of the potentialities of the vast fuel deposits immediately at hand, which certainly can be used to firm up the power, and do it more cheaply. In spite of assertions that Echo Park Dam is needed, we have seen no concrete evidence supporting such a contention. Without such evidence, there can be no justification for authorizing it.

It has been stated that construction of the dam within Dinosaur National Monument would not constitute a precedent endangering other national park system areas. Precedents are facts; mere assertion an action is not intended to be a precedent does not reduce the danger or effects. Once any such project is built in any unit of the national park system, the door will be open to identical invasion of other national parks; and once this sort of misuse of our national parks becomes a reality, it will be correspondingly easier to break down the protection given the national park system against other forms of exploitation.

The danger is real, serious, and must be averted.

I was very happy to hear Senator Watkins read part of our letter at the hearing.

Comment has been made at this hearing that it does not matter so greatly what happens to a national monument, with the implication that such areas are lesser stepchildren of the national parks. The essential difference between national parks and national monuments is simply a matter of methods of establishing them. National monuments possess equal values and qualities that warrant inviolate protection. They are integral units of the national park system, administered under identical policies, and the National Park Service views its responsibilities toward them as founded on the act of August 25, 1916, just as firmly as are the national parks. Anything happening to damage a national monument would serve as a precedent for damage to a national park.

The attempt to secure congressional authorization to invade Dinosaur National Monument is designed as the entering wedge, as the easiest way to gain access to other national park system areas. There are at least 16 other major projects now proposed; some of them already have been debated in Congress.

In Glacier National Park, the Glacier View Dam would flood 20,000 areas of virgin forests and critical wildlife habitat. The Belly River-Waterton Lake diversion project would be located in the northern part of the park.

In Yellowstone National Park, the proposal to dam Yellowstone Lake was bitterly debated during the 1920's, and was revived as recently as 1938. The Bechler Basin project generated an equally intense controversy.

Kings Canyon National Park is viewed as the site of at least five major dams, with the possibility of additional proposals there.

The Wawona project would flood part of Yosemite National Park and a dam in Little Yosemite Valley has been proposed.

Mining City Dam in Kentucky would flood Mammoth Cave National Park. Senator Chapman of Kentucky placed a rider on the rivers and harbors bill prohibiting use of funds for its construction, while studies are made of other suitable locations for the dam.

The Bridge Canyon Dam would flood the entire length of Grand Canyon National Monument and 18 miles into the national park. The Kanab tunnel would divert the Colorado River out of the Grand Canyon itself.

Authorization of Echo Park Dam would be a definite precedent endangering these and other national park system areas.

Question has been raised whether the precedent may not be the other way around that enlargement of Dinosaur National Monument may represent an invasion of an area reserved for water development, and whether the National Park Service made commitments that such projects could be built in the monument.

After enactment of the reclamation laws, reclamation withdrawals were made covering almost every existing and potential source of water in the West; they were designed to protect homesteaders and private enterprise especially in the event such use of the particular source was needed. Between 1902 and 1938, a number of such withdrawals were applied to lands now within the national monument.

Senator ANDERSON. Going back to the Bridge Canyon Dam, you say that it would flood the entire Grand Canyon Monument and 18 miles into the national park?

Mr. PACKARD. Yes.

Senator ANDERSON. I thought I attended every one of the central Arizona project hearings. Did you appear at that time?

Mr. PACKARD. I tried on I think six different occasions to get into those hearings to testify. As I recall, they ran about a month. On every occasion I was told it was not possible to schedule me. I read most of the six volumes of the hearings and there is no mention of that fact in those hearings.

Senator ANDERSON. I did not read them. I lived through them.

Mr. PACKARD. You have my sympathy.

Senator ANDERSON. There wasn't a word said about it.

Mr. PACKARD. I tried to get into the hearings six different times and was informed it wasn't possible.

Senator ANDERSON. To whom did you make application?

Mr. PACKARD. I don't recall. It was someone in the committee office and also I believe I spoke to Senator O'Mahoney about it.

Senator ANDERSON. How high was that dam, Bridge Canyon Dam?

Mr. PACKARD. It was proposed in the bill at 877 feet. The bill originally read "not less than" and meant "not more than." Frederick Olmstead made a thorough survey of that in which he pointed out the catastrophic effects of that dam on the national park.

Senator ANDERSON. Did anybody talk about a 877-foot dam?

Mr. PACKARD. Or 72 feet. It was almost to the 2,000-foot contour.

Senator ANDERSON. I think that is a pretty extreme statement.

Mr. PACKARD. I misunderstood. That is the elevation, but not the height of the dam.

Senator ANDERSON. If we built a dam in New Mexico at 9,000 feet, would you call it a 9,000-foot dam?

Mr. PACKARD. That is the contour, I am sorry.

Senator ANDERSON. I am glad I did not completely overlook a 1,800-foot dam. That illustrates the importance of getting facts straight.

Mr. PACKARD. Shall I go on?

Senator ANDERSON. Yes.

Mr. PACKARD. The proclamation of 1938 canceled and superseded all but one of these withdrawals, the covering the Brown's Park Reservoir site of 1904. The proclamation was drafted with the aid of then Assistant Commissioner of Reclamation Straus, who was careful that it be specific and positive. Although the proclamation does reserve the right to build the Brown's Park project, this provision was included as a legal matter, because it was then known the dam could not be built because of defects in the geological structure.

Senator ANDERSON. You mean deceitful or dishonest?

Mr. PACKARD. No.

Senator ANDERSON. You wouldn't contend making a reservation to make a dam that couldn't be built was deceitful.

Mr. PACKARD. It was perfectly proper. May I complete it?

Senator ANDERSON. Yes.

Mr. PACKARD. The Bureau so advised the National Park Service, and said it was abandoning its plans for the Brown's Park Dam. The question at issue was whether to draw the northern monument boundary below this site, to exclude this project, which could have been done if the project were going to be built. Knowing it could not be built, however, the Park Service felt it safe to include the additional 4 miles in the enlargement. Abandoning a project involves time and redtape, and, rather than delay the proclamation, it was agreed to comply with technical legal requirements of the moment to reserve the right to build this infeasible project. The Park Service knew it could not be built, and so could never constitute an invasion of the national park system.

It was a perfectly orderly procedure, I think.

The other related provision of the proclamation applies the Federal Power Act, as amended, to the monument. The amendments of 1921 and 1935 provide that no power licenses shall be issued in any existing or new national park or monument. Therefore, the reference to that act further emphasizes the proclamation is intended to prohibit any project except the Brown's Park project in the monument. The meaning and significance of this law as it relates to the case in point and to the national park system as a whole, is discussed thoroughly in the legal brief by the noted attorney Mr. Manly Fleischmann, published on pages 557 through 563 of the Senate hearings on S. 1555, 83d Congress. The basic point is that the proclamation means exactly what it says.

In spite of the fact the proclamation represents the understanding of agreement between the National Park Service and the Bureau of Reclamation on this subject, it has been widely asserted the Park Service made general promises that enlargement of the monument would not prevent use of the monument for dam sites at any location within its boundaries. Specifically, the charge is made that the Park Service promised Echo Park dam could be built as a result of hearings in Utah in 1936. Secretary McKay himself has stated frankly that nothing in the proclamation could be construed as approval of

Echo Park Dam, and further, in my presence, declared no official of the Department of the Interior had made contrary assertion or was empowered to do so. It was with surprise that we heard one of the Bureau of Reclamation witnesses state at this hearing that the proclamation did relate to the Echo Park site, for in doing so he was directly disputing the position of his chief.

The principal concern of the people of Utah when the hearings were held in 1936 was that certain grazing privileges be respected. The Park Service agreed to respect them, and it has lived up to its agreement. On June 8, 1936, Secretary Ickes instructed the Director of the National Park Service that questions of water development should not be determined at these hearings, but should be left to future determination by Congress (Senate hearings, pp. 555–557).

Neither the Director of the National Park Service, nor his representative, had any authority to make commitments on the subject. The only person who could do so was the Secretary of the Interior. I have read the report of the hearings of 1936 submitted to the Director, and it concentrates on grazing issues. Not one word is said about water development. It is inconceivable that if any commitments were made at the hearings—and if such were made, they would be in violation of the Secretary's orders—the Director would not have been informed; they would have to be confirmed by him in any event, and by the Secretary.

Far from agreeing to misuse of the monument for such purposes, Director Drury vigorously protested the Bureau of Reclamation's application for a new withdrawal covering the Echo Park site in 1943, of which he had not been informed. (House hearings on H. R. 4449, 83d. Cong.) Cooperative studies were in progress to determine the recreational resources of the Colorado River Basin, studies designed to establish the Park Service's position on the many projects proposed there. Completed in 1946, the report of these investigations devotes one full chapter to the strong opposition of the National Park Service to the proposed dams in Dinosaur National Monument. There was, and is, no question whatever that the Park Service has not and does not approve the invasion of the national monument; its position has been consistent, and it has not violated any agreement it has made.

The controversy over Echo Park dam as an element of the Colorado River project has now raged since 1949. Originally it was the only seriously controversial aspect of the project. Had the proponents been willing to support our recommendations that a sincere effort be made to revise the overall project to eliminate this undesirable feature—and, in spite of many assertions, it has yet to be demonstrated it cannot be so revised—it is probable progress would have been made in securing permission to start work on it. As it is, the 5 years' delay has caused closer scrutiny of other aspects, its economic and engineering feasibility, the lack of benefit to Colorado, and other questions which we who are concerned with the preservation of our national park system are not qualified to discuss thoroughly. It is perhaps regrettable that production of the desired water benefits has been so delayed; but if the outcome is a sound, better balanced, and less expensive program, the results will be in the interest of the upper basin States and of the Nation as a whole.

Thank you.

Senator ANDERSON. Thank you very much.
Mr. Eggert, please.

TESTIMONY OF CHARLES EGGERT, DIRECTOR OF MOTION PICTURES FOR THE NATIONAL PARKS ASSOCIATION

Mr. EGGERT. In am Charles Eggert. I reside at Barrytown, N. Y. For the past several years I have also leased a small ranch in Wyoming and have spent a considerable part of the past 5 years in that part of the West, with a "home" base in a little town called Shell. I am a professional motion picture photographer, and I am the director of motion pictures for the National Parks Association. I am representing this organization at this hearing.

However, the opinions and expressions I am about to say might well represent those of any ordinary citizen had he been given the opportunities I have had with regard to Dinosaur National Monument.

I have visited many of our national park areas. During my early years I saw Yosemite, Yellowstone, Sequoia and Kings Canyon, Rocky Mountain and many other outstanding scenic areas. I use "saw" advisedly, for that's exactly what I did. I saw graceful Yosemite Falls, the huge Redwood giants, a spectacularly beautiful and frightening river gorge, and a hot fountain of water which shot into the air every hour. I called them scenic freaks and I am certain that I viewed the wonders of Yellowstone for the first time with the same curiosity as I gazed upon the tattooed woman in the circus.

It took me many visits and many years to discover that these things—even the tattooed lady—had a deeper and more significant meaning than mere scenic freaks. I don't mean to go any deeper into the philosophy and psychology of tattooing, though they are there, just as they are in our national parks. I mean to discuss in part these things. In the summer of 1950 I visited Yellowstone for the third time. During that visit I discovered something that meant more to the soul and then to the eye. I discovered that thing we call spiritual value for lack of better words, and it cannot be described, nor can a doctor write a prescription for its attainment, nor will a psychiatrist's shock treatment make you aware of it. There is no guidebook to finding serenity, nor will there ever be one written.

It is something which grows within one. It is the thing which drives one away from the city and into the country—and even farther, into the wilderness. For it is in the wilderness where one realizes it to its fullest extent.

Why is it we all seem to have that favorite fishing hole we long for and run to at the first opportunity? The wilderness, it seems, is the place we come to, to rediscover ourselves and a place where we can place ourselves in proper perspective to the world around us.

I often wonder whether or not wilderness is man's one instinct, for when he is troubled, confused, or dismayed, does he not seek some secluded spot to ponder? It may be his study, his church, or the woods behind his house. The most rewarding choice seems always to be the wilderness which is separated from the stigmas, dogmas, and set rules which seem to trouble man most. Here seems to be eternity, almost, unaffected by the everyday adjustments and changes and conflicts our busy lives force upon us. That not all of us have found this

spiritual value in our national park areas does not mean it isn't there. It is there, gentlemen, and may God bless you with the happiness of discovering it.

I am certain each of you has had an experience synonymous to one I had last summer. My father was one of the last of those generations still strong in the thralls of puritanical hard work. He took 10 days out of every year to visit one place, Sault Ste. Marie, Mich. I vividly remember those early excursions to the "Soo"—in the years when there was a one-lane gravel road on the upper peninsula from St. Ignace to Sault Ste. Marie. I remember the deep forests which grew right to the fenders of the car. I remember too, the great forest fires up there. We were once delayed 3 days because of one. I was deeply impressed by these devastating fires. But no one seemed to care then terribly much in the early twenties. There were so many trees then. I recall during one of these trips when we ran into a fire, we picked up a family of real, live Indians who were driven from their forest home. And I remember the many happy hours my dad and I spent in the evening sitting by the great locks watching the big boats pass through, almost phantomlike.

There are experiences of childhood which are deeply imbedded within me. They ended with the death of my father in 1929 when I was 11. I never returned to the Soo until last summer. As I drove closer and closer I anticipated with pleasure the thought of reliving some of those childhood experiences.

It used to take one whole day to get from Mackinaw City to Sault Ste. Marie. There were no sleeping accommodations between. Now motels crowd the little towns of Mackinaw City and St. Ignace. They seem to line the road all the way to the Soo. I couldn't believe that in a matter of 2 hours I was able to make a trip which once took us a whole day. But the big change was the forests. There weren't any. Here and there there might be a small patch of the old trees, left as a reminder of what once was. This was a distinct shock, for though I had expected to find that civilization had crept in during the past 26 years, I wasn't prepared for the effect it would have on me.

And, once arrived at the Soo I wasn't allowed the pleasure of reliving a past because today one can't get near the locks. They are barricaded by a high fence and rolls of barbed wire all about. I was told I would need three separate passes to get out to them.

It would be impossible to describe the disappointment I felt as I peeked through the fence to get a little glimpse of what used to be a childhood pleasure. Civilization had cheated me of the opportunity to reminisce. There was no use staying around—the place I knew was gone—so I left the next morning. I left feeling thankful that my father wasn't there. He would have been heartbroken.

Now this may well sound like very sloppy sentimentalism. We who wish to safeguard and protect our wilderness scenic heritage are very ofen called sentimentalists. I wouldn't here propose for one moment that upper Michigan be set aside simply because I happened to have known it as a wilderness, nor that the iron fence around the locks at the Soo be removed in deference to national defense for the pleasure of my personal reminiscing. But I certainly

will propose here that you and I are obligated to protect from exploitation those few areas which have been set aside as national park units. The whole philosophy of setting them aside was to protect them from exploitation, to safeguard the natural scenic beauty, to keep us in touch with the past so that all of us can see where we have been, and therefore to see more clearly where we are going. These are places where we can afford the extravagance of reminiscing.

Dinosaur National Monument is one of these units. Since 1952 I have gone there every summer.

I am building up the very same kind of relationship with my two children there as I had with my father. My 9-year-old and I have shared experiences there which I hope he will be able to share with his children.

Through their experiences with Dinosaur National Monument, my children will learn of the great forces of the earth. Along with me, my oldest boy has had the fun of river exploration, just as Maj. John Wesley Powell had 85 years ago, and I believe one of the most admirable things our Congressmen in the past have done is to establish and protect this magnificient park system to give all of us the opportunity, from generation to generation, to keep within families the admirable tradition of wilderness experience of our past.

It seems to me that we here today are faced with a very simple, but very profound question: Are we going to remain solidly behind the principles for which we have created our national park system, or are we going to destroy them as it may at the moment seen necessary. Once we have made an exception—and it has been proposed that Dinosaur in this instance will be an exception—it becomes easier to find other exceptions. Unless we stick hard to the rules we may as well have no rules whatsoever. The kidnaper who steals a child from a family of 10 is not let off because that family had many children.

Now, about the monument itself, I don't mean to be presumptuous but I believe I know the place as well as anyone else in this room, that is, from the standpoint of the tourist. I do not pretend to know it from a scientific viewpoint. I am no geologist or archeologist or any other kind of scientist. Nor am I an engineer. I am simply a sightseer and a photographer who's business it is to evalute what is to be of beauty and of interest to the eye.

I spent 3 weeks in May and June of 1952, 3 weeks of June in 1953, and a weekend in May 1954 at Dinosaur.

My first trip there was in part to make a documentary motion picture for the National Park Service. My second trip there was to make a second documentary film for the Sierra Club. My trip last spring was to finally acquaint my family with the beauties of Dinosaur, which, by this time, had become a household word. I have traveled by car and jeep over most of its roads. I have walked many of the trails. I have flown over the monument in a private plane twice. These flights were for the purpose of orienting the seasonal park rangers for fire duty, and I assure you, we all were quite oriented.

I have traveled the entire length of the Yampa River in the monument, and the Green River, with the exception of Lodore Canyon from upper Disaster Falls to the junction of the Yampa, which is about three-fourths of that canyon. However I am planning to make that

stretch this coming spring when I make a river trip the entire length of the Green from Wyoming to its junction with the Colorado, and then down the Colorado through the entire length of the Grand Canyon, ending at Tempe Bar at the head of Lake Mead.

Incidentally, if any of you gentlemen want to get a firsthand look at the upper Colorado River Basin, this will be a golden opportunity, and I invite your inquiry following this session.

But to get back 800 miles upriver to Dinosaur again, I am appalled by the half-truths and misinformation which I have heard and read at various times about the monument. One of the so-called valid reasons for destroying Dinosaur is its inaccessibility. Dinosaur isn't inaccessible because it is buried deep within the earth, or located somewhere between Everest and K–2, or in Antarctica. It is 25 miles due north of a major transcontinental highway—U. S. 40. It is halfway between Denver and Salt Lake City. It is far closer by many miles to a major highway than is the Grand Canyon. It is far closer to major transportation than was Yellowstone in its infancy.

Dinosaur is inaccessible for one reason alone. There isn't a single decent road into it. It isn't inaccessible because a road cannot be built, because roads have been built in to it, and today you can reach the river's edge at several places: at Rainbow Park, at Island Park, at Echo Park, at Castle Park, at Lily Park, and at the Gates of the Lodore.

There is also a road to Split Mountain Gorge. Knowing the monument as I do, I don't see the need for automobile access to any other area.

These roads can be dangerous because they are mud roads, and when they are wet, even from a slight rain, they are practically impassable.

They are dangerous too because they have not been properly graded, and a severe downpour can cause a washout. In dry weather, any kind of car can travel them today.

There is only one steep grade—a series of switchbacks—in the whole road system in Dinosaur, at Iron Spring Draw, just below the junction of the road to Harpers Corner. From what I have seen of that area, the road could be relocated to avoid this section.

During the House subcommittee hearings on this question last year, a gentleman who supposedly knew what he was talking about, stated that there was no easy access to the river. This simply is not true. In 1952 I drove my Ford ranchwagon to the edge of the Green River at Echo Park. I also went to the edge of the Yampa River in a two-wheel drive pickup truck at Castle Park, and to Island Park, and to the Gates of the Lodore. I know from firsthand experience that you can get around in Dinosaur by automobile.

Proponents for the Echo Park project have stated what a wonderful recreational area Dinosaur will become when the dam is built. I don't quite know how the place becomes more accessible with a reservoir. A reservoir is not going to change the land contour. In this respect, the only apparent answer is that a dam is being used as a reason for a good road.

As a matter of fact, with a reservoir, the monument, if anything, will become less accessible. A lot of exaggerating has been done about these river trips on the Green and Yampa Rivers in Dinosaur.

On the one extreme, there are a few who would have you believe anyone could paddle a canoe safely through all of it, and on the other extreme, a few would have you believe the rivers to be so treacherous that they are impossible to travel at all.

The one very unique thing about Dinosaur is the present possibility to travel through its fabulous canyons by boat. I can't imagine a better way to see a canyon than by floating through it. In Dinosaur this is possible and you don't have to use a motor or one ounce of gasoline. Today there is a natural wilderness trail with its own motivating power. With a reservoir, power boats would be necessary and gas and oil facilities would have to be installed.

Neither of these is true. Safety on the river depends upon what part of them you are talking about and who is running the boat. If we speak of Lodore Canyon at the north section of the monument, or Split Mountain Canyon at the south end, we are speaking of dangerous river water, for there are rapids here which are respected by competent boatmen.

If we are speaking of Yampa Canyon, and Whirlpool Canyon, we can recommend it to any experienced canoeist, and if we are speaking of that section of the Yampa from Castle Park to Echo Park, which is a nice half-day run on the river, we can recommend it to anyone who wants to float down on a rubber tube. I am not an experienced boatman, and I wouldn't entertain the idea for one moment of running a boat through Lodore or Split Mountain any more than I would entertain the idea of skiing down the summits of Long's Peak. I don't know how to run a boat well enough or ski well enough to do either. For those experienced in these things, it is perfectly safe. However, I wouldn't hesitate for a moment to take my family in my own boat from Castle Park to Echo Park.

Those of us who would like to see Dinosaur developed as our other major national park areas have been, can see the great potential of these river trips for the visitor. There is no experience like it in any other national park unit. From talking over the developmental possibilities with the Superintendent, Jess Lombard, I understand that a tentative plan would be to build major accommodations in Echo Park. The visitor could leave by bus after breakfast for Castle Park where he would get into a boat and travel back on the river through this very easy section of Yampa Canyon, getting back to the hotel in time for lunch. If the river trips were no more than this, they would be justified, for this stretch of the river offers some of the most spectacular views in Dinosaur. However, longer trips could be arranged just as they are today, to go through the entire length of Yampa, Lodore, Whirlpool, and Split Mountain Canyons.

It seems to me enough proof of the possibilities of river travel in Dinosaur has been shown by the trips which the Sierra and other groups have made through the monument. Hundreds of people have gone through—all the way—without a mishap.

Any accidents which have occurred in Dinosaur have been due to incompetence or lack of proper caution. I don't understand why such vehement attacks have been made on the safety of river travel in Dinosaur.

A local Utah paper mentioned hardly a word about the 200 Sierra Club members who went safely through Dinosaur—from Lily Park

to Split Mountain Gorge in 1953. Yet a private party which went through at the same time got dumped in Split Mountain and nearly ended up disastrously. This event appeared in headlines, yet no mention was made of the fact that some of the members of this private party were said to have had more liquor than Green River water on their breaths at the time and weren't watching what they were doing.

It is my contention that the river in its present state will remain far safer than a reservoir will ever be. I have had some experience with amateur boatmen on lakes, and I know of many, many fatal accidents. Boats have a strange way of capsizing just as easily on quiet water, too.

That is as far as I got with my statement. I would like to make a couple of comments.

What would be destroyed? There has been talk here today about a dry canyon bottom, dry canyon. The Dinosaur Canyons aren't dry. There is a river. If they flood it every deciduous tree with the exception of the aspens that grow way up in the highlands will be lost.

The area that will remain where the reservoir level will come is a desert. It is all sagebrush and maybe some scrub brush, but mostly sagebrush, very dry.

Major caves, major petroglyphs, will be under water. There will be no good place to camp because at the river bottoms you find a certain amount of shade and grass and cool air where you will not find them anywhere around the edge of what will be the reservoir.

I was going to tell you something else. I believe that is about the most important thing I have to say on it. I think flooding the place will really destroy what there is there and that there will be nothing left.

A reservoir in that place in the summertime it seems to me will be unusable because it will be locked in canyon walls and it will be one of the hottest places I think you will possibly imagine on earth and if we have to use power boats to get around on it it will be one of the noisiest places because you will get the reverberation of motors.

In my opinion, I have seen the place, I think it will be one of the most unattractive places in the country.

Senator ANDERSON. At least you have had the experience of being there many times.

Mr. Callison?

Mr. ZAHNISER. Could we have Mr. Callison's statement inserted in the record at this point, and I will see that it is furnished to you later next week.

Senator ANDERSON. Thank you.

Mr. ZAHNISER. Mr. Callison is going to a convention of the National Wildlife Federation, and he hoped the record would be open long enough for him to get his statement in.

Senator ANDERSON. I have told him since the meeting will be a week from Sunday, we would send the rest of the text to the printer probably by Saturday, but we would permit him to hold the record open so the resolution of the National Wildlife Federation can be accepted if he gets it to us by Monday or at the latest Tuesday morning.

(Mr. Callison's letter follows:)

MONTREAL, QUEBEC, CANADA, *March 14, 1955.*

Hon. CLINTON P. ANDERSON,
Chairman, Subcommittee on Irrigation,
United States Senate, Washington, D. C.:

The following resolution was adopted by the National Wildlife Federation in annual convention at Montreal, March 13, 1955, with 30 States voting aye, 12 States voting no. Request inclusion in record recent hearings on S. 500, Colorado storage project.

RESOLUTION OF NATIONAL WILDLIFE FEDERATION

"Whereas the national park system established by law is urgently needed and is increasingly being supported and enjoyed by millions of people; and

"Whereas progressive losses of recreational facilities in the various States apparently cannot be stopped and recreational lands increased for the use of all of the people; and

"Whereas such continuing loss in the light of increased use of outdoor recreational opportunities makes this condition alarming; and

"Whereas any legislation that would authorize the construction of the proposed Echo Park Dam in the Dinosaur National Monument in northwestern Colorado and northeastern Utah would open the way for further destruction of other recreational areas in our monuments and parks; and

"Whereas the alternatives that have been offered have never been adequately studied by the Bureau of Reclamation and have never been proven inferior; and

"Whereas the necessity for Echo Park Dam has never been fully demonstrated: Therefore, be it

"*Resolved*, That the National Wildlife Federation in line with its policy of fighting for increased recreational opportunities for all of the people take every action possible to oppose the construction of Echo Park Dam and to preserve the Dinosaur National Monument as it is now constituted and to do everything possible to see that our national park system is not needlessly invaded or despoiled."

CHAS. H. CALLISON, *Secretary.*

Senator ANDERSON. You may proceed, Mr. Zahniser.

STATEMENT OF HOWARD ZAHNISER, EXECUTIVE SECRETARY, THE WILDERNESS SOCIETY, EDITOR, THE LIVING WILDERNESS

Mr. ZAHNISER. I am Howard Zahniser. I am executive secretary of the Wilderness Society and editor of the Living Wilderness, with headquarters here in Washington, D. C., at 2144 P Street NW.

I appreciate very much, Senator Anderson, your invitation, inviting me to come down to take part in these hearings, and I hope I can contribute a little. What I mainly want to do at this point is to tell you that we all who have speaking in behalf of conservation organizations appreciate very much your kindness in coming down here and being with us today.

We know your interest in wilderness preservation, too. We know that you understand these values that we are talking about. You referred earlier in the day to the Gila Wilderness controversy. We know the great part that you played in preserving that wilderness for all of us, and I know you will be interested to have me remind you of the hearing held in Silver City in 1952. Unfortunately a coronary accident kept me from going there myself, though I had been in that area twice before studying the problem and had participated in the preparation for it, but at that hearing practically all the organizations who are here today were actively represented.

Senator ANDERSON. I remember Miss Harlean James was there.

Mr. ZAHNISER. Yes; and Mr. Fred Packard was present, representing the National Parks Association, and also in my emergency he presented the statement I had prepared for the Wilderness Society.

Mr. J. W. Penfold, the western representative of the Izaac Walton League, who testified first this morning, was present at that hearing and made a study of the area before attending the hearing.

The Sierra Club was represented very effectively there, on the side you testified for, by Mr. Weldon Heald.

I remember last September the stormy Sunday on which you made the address in dedication of the memorial to Aldo Leopold at that Gila Wilderness overlook and the fine expression of wilderness values you made at that time. The wilderness society I represent here today was the organization that in cooperation with the Forest Service sponsored that occasion. It has been our purpose throughout the country to seek the preservation of the areas that still remain, that are of significance because they represent primeval conditions. They represent the land as it was before man started to modify it.

That is our concern with this bill, that you are considering here today.

There is one big question in our minds. It has to do with Echo Park. It is the Echo Park question. I remember summer before last when I was down in Echo Park—and it is a park, a beautiful park, an historic place; the expedition that Major Powell led down the Colorado camped there, and Major Powell wrote of it as the "size of a good farm." We were down in that park, and I was wandering around perplexed by this problem which we had already been discussing within our conservation circles. I stood there along the Green River, looking across at that sheer cliff wall of Steamboat Rock, and something moved me, and I yelled across there. "Should we build a dam here?" And that Echo came back "Dam here?"

That seems to me to be the question we are facing here. We are not opposing the building of dams. We are not opposing a project for development of the upper Colorado River. We are concerned because of the site—not because of the dam, but because of the place.

Senator ANDERSON. But you do have to concede that you are opposed to Echo Park, you had opposed the Bridge Canyon site and opposed the Glen Canyon site, and if you take those three out of there then you have removed any possibility of putting a dam in there.

I am just wondering how you ever missed on Hoover Dam. Because there can always be some objection to every one of these.

Mr. ZAHNISER. It wasn't my good fortune to visit the site that is now inundated by the Hoover Dam, but my reading of the literature and my discussion with people who had been there leads me to believe that it was not an area of the supreme value that this area of the Green and Yampa Canyons and Echo Park is.

This area, it seems to me, is really one of the supreme areas. It is hard to convey the impression that it gives to people. A number of people have asked me about it here in Washington, and it has seemed to me that the easiest way to convey some measure of the magnificence of it is by imagining one's self standing down here in front of the Washington Monument. We all know the Washington Monument, its magnificent thrust into the sky and the feeling of aspiration and nobility we have when we look at it. It goes up 555 feet.

But Steamboat Rock that you look at from Echo Park, it goes up a hundred feet and more above that. It's about 700 feet to the top of that rock.

You feel a sort of presence there—with a capital "P," if you get what I mean——

Senator ANDERSON. I do. I only point out to you the criterion you have laid down here is that it must not disturb the natural scene. I am sure the Washington Monument disturbs the natural scene, the Lincoln Memorial does, too. If you say every time the test must be Does it change anything? then everything we have done has changed something or other.

I think of the Jefferson Memorial, Lincoln Memorial, and the Washington Monument—all would have been ruled out by the yardstick you put in here.

Mr. ZAHNISER. I wouldn't apply that same criterion to every area.

The Washington Monument is a work of art. We did it. One of the things that makes me feel good when I stand in front of it is the consciousness that that is a human thing, an artifact. That is something we did. I referred to it here, because that is the best way I have found of conveying a measure of the magnificance we are trying to appreciate. But at the Washington Monument I do not have the same emotion I have felt when I have stood there at Steamboat Rock. Steamboat Rock makes me feel little, and overawed, in the presence of something great. The Washington Monument represents George Washington, a fellow man. I feel a different thing in a natural area, and I think we need both.

But my point at the time was that this is one of the magnificent places. You feel that as you are in Echo Park looking at Steamboat Rock.

Then you go up around on the plateau and come out on a projecting point, Harpers Corner. You stand there and look down on Steamboat Rock, and you realize that large as it is, it is in a canyon that goes up 2,000 feet.

You look down below that point and realize that down there someone wants to build a dam, an impoundment that would be almost as high as the Washington Monument. You begin to sense that this magnificent historic place of great significance to you means something else to somebody else.

I think Mr. Larson, the regional director for the Bureau of Reclamation, referred to it last year as "that remarkable storage vessel," showing that he has a great admiration for it, but an admiration for a different sort of thing.

As you go away from that scene, feeling these things, you begin to realize that this is one of the few places that have been set aside for special protection. That is another difference between it and the Hoover Dam area. The Hoover area was not one of those that we had chosen to set aside for special preservation.

Senator ANDERSON. Maybe I can make it easier when I say that you folks are greatly worried and I can see that you have some reason to be worried, that this might start a program of invading the national parks.

I think the circumstances are completely different and I think that it might not do that but assume that you are correct. You can realize

that we might start getting worried, too, when you start testifying or people start testifying here that Bridge Canyon Dam is going to be opposed also because it has certain bad elements about it. I listened to all the testimony on the central Arizona project and voted for it, and I believe I would vote for the project again; but I realize if it ever comes before the Congress again we will have another conference of 27 conservation societies, Upper New York, the Conservation Society of Yale, and Conservation Society of Dartmouth will profoundly proclaim that you can't build the Bridge Canyon Dam because it will inundate a portion of the Colorado River and Grand Canyon area.

So the natural reaction in the minds of some people, certainly in mine, is that maybe we had better deal with this question now because if everything in America is going to stop because it could conceivably interfere with something, we are going to find it out.

The argument against Bridge Canyon is remarkable. It means that Arizona shall have no water, California doesn't want them to. The argument against this means you shall have no water. California doesn't want them to. How far do these California propagandists go in determining this policy?

Mr. ZAHNISER. Senator Anderson, I am a product of the Allegheny River Valley of western Pennsylvania, educated in the State of Illinois, a resident of Maryland. I have been in all the States. It has been my privilege to visit the beautiful places in all the States. I like California, but I know the Sierra Club and its members very well, and I know the Sierra Club is concerned with the preservation of any of these National Park System areas wherever they are. This concern is an aspect of their interest which you and I share, rather than a result of the citizenship that they share with other Californians. They fought in 1913, and before that, under the leadership of John Muir, against the Hetch Hetchy Dam, as vigorously as now, and that was a reservoir proposed for a water supply for their own headquarters city, San Francisco, in California.

Senator ANDERSON. Shasta, Hoover Dam, Bonneville, Columbia, Grand Coulee, every one of them has some little attribute.

Mr. ZAHNISER. Each that you have named is outside a National Park System area. The Hetch Hetchy Dam was and is within the National Park System. Echo Park is within. I agree with you that we must realize that we are facing the issue now of what we are going to do about our national parks. Take the first thing on Echo Park.

Senator ANDERSON. The man who just testified told us how he liked to go see Sault Ste. Marie and the like. I didn't realize they disturbed natural scenes. If we had not built them the river could move through without this ugly manmade thing that disturbed the natural scene. If we go on with this we are in an endless controversy.

Mr. ZAHNISER. There is a nostalgia we all feel for things unchanged. We cannot satisfy it everywhere, of course, but we have a national policy whereby we hope to satisfy that in perpetuity within certain areas, not outside these areas.

So it seems to me that we are analyzing this proposal correctly when we say that we are definitely facing here and now that issue of protecting areas within the National Park System. It is not only, should we do this to this particular unique, irreplaceable, scenic wonder within these canyons? But also, should we allow our national

policy for the preservation of such areas, through the establishment of a National Park System, to be modified or interfered with? That is the thing that you reflect on as you stand up there on Harpers Corner.

Senator ANDERSON. I recognize that. I am only trying to say to you in the original discussion of this at one time I felt pretty strongly that Dinosaur Monument should not be invaded in anyway and I have been hopeful since as I expressed today, that it would be possible to achieve that, but I see now that the program of the conservationists is not just to protect the Dinosaur National Monument. It is to prevent the entire construction of the upper Colorado Basin project if you take out Echo and Glen Canyon and refuse to protect Bridge Canyon all we do is let the waters run to California, and California lets them run to the sea.

That is the logical answer to the statements made here today.

Mr. ZAHNISER. It has been my understanding—I am not an engineer or even a lawyer, but I am a very much interested citizen in these matters, and for 5 years I have read as much as I could and have handled as an editor some material on this project—and it has been my understanding that the upper Colorado River project could be accomplished without the construction of the Echo Park or Split Mountain Dams; that those two projects are not necessary.

Senator ANDERSON. Getting back to the testimony, you don't like Glen Canyon, don't like Echo Park, don't like Bridge Canyon. Now there isn't anybody, I would say, that would even remotely try to contend that the upper basin States could use any part of their water if all three of those are to be ruled out. Therefore, what your testimony really is is that in order to preserve Dinosaur you are willing that the entire upper Colorado Basin shall never use one drop of this water. That, reduced to its simplest terms, is the testimony you have given us here today. I say that it shocks me a little bit because I know that, I want to make this clear, I know you are a very devoted and upright and conscientious person as are other people who have testified here today.

Mr. ZAHNISER. Thank you, and so are you.

Senator ANDERSON. I try to be, but I know you folks are and I know you are sincerely interested in conservation. I know how far you would like to go to preserve the scenic beauties of this country of ours. I commend you rather than criticize you for that.

However, I do think that you have to recognize that the upper Colorado Basin States have some rights in this question also, and apparently we never had the same type of opposition to these projects until the State of California decided it didn't want them built.

Mr. ZAHNISER. I think I had a great deal to do with enlisting the opposition of the Sierra Club to this project. You might not feel disposed at this time to thank me for that, but I think it would indicate to you that the progression was not from California to Pennsylvania, but in this particular instance from The Wilderness Society headquarters in Washington toward California. That was in 1950, when with other national organizations we sought to enlist the support of the Sierra Club because it was a western organization. Up to that time the Sierra Club folks had not conducted the trips that they later took and then went, and saw, and became convinced that they should oppose this Echo Park project so vigorously because of

its values, not because of any other interest that they shared with fellow citizens of their State.

Senator ANDERSON. Perhaps I am unduly conscious of it because I tried to call attention a day or two ago to the fact that when the Frying Pan-Arkansas project was before this committee and before the Congress, although it would divert far more water out of the basin than the San Juan-Chama transmountain diversion would divert, California representatives said:

> We don't oppose this. Let the people of Colorado take out the Arkansas-Frying Pan water in far greater quantities than the San Juan transmountain diversion project but don't let the San Juan transmountain diversion project be built because that would divert water; don't let Little Gooseberry project be built because that takes 12,500 acre-feet out of the basin but other projects could take out several hundred thousand and that is all right.

Now, we go along with this sort of thing and the Bridge Canyon project is presented, it is discussed before this committee, it stays here a solid month; there isn't a word said about it, there isn't a word said on the floor about it; all the discussion takes place, nothing wrong with Bridge Canyon because that was going to be to the benefit of a lower basin State, but when the upper basin State comes in then not only is its project bad but suddenly the Bridge Canyon project has become bad and every other project including Grand Canyon becomes bad and you begin to wonder where principle stops and expediency begins.

Mr. ZAHNISER. I am concerned with the whole system of areas that we are trying to preserve—the Gila Wilderness at one time, the Dinosaur National Monument at another time.

Senator ANDERSON. I tried to say I recognize you are a good man of good impulses and I am only trying to point out to you that some of these things are difficult for us to understand.

Mr. ZAHNISER. You heard very competent testimony this morning from J. W. Penfold, representing the Izaac Walton League of the West, with residence in Denver, to the effect that the Glen Canyon structure offers a very good prospect in connection with this predicament that we are in. It is not that the Glen Canyon Dam could not be constructed, but rather that the Glen Canyon Dam should be so constructed as to safeguard the Rainbow Bridge National Monument. We have been assured that that can be done.

Senator ANDERSON. You don't trust it, though, because shortly thereafter we had some testimony that it could be done if the rock there was not of such character that the water might seep through and if it did we would wander through miles of mud and slush as we got around in there looking for it.

Go ahead.

Mr. ZAHNISER. I was at the point of saying that not only does the proposed Echo Park Dam destroy what seems to us to be an absolutely marvelous place that should not be destroyed, just because of its superlative character, but likewise because it is part of the national park system. Also, we do not feel that it is necessary to the upper Colorado River project.

Senator ANDERSON. That is what I have been hoping there would be some testimony on because it has seemed to me there was a possibility of pointing out sometime that if the Cross Mountain site and Flaming Gorge sites and others were developed properly, there might be some

alternatives. Thus far I haven't heard the alternatives discussed much.

Mr. ZAHNISER. I am sorry our presentation—I say "ours" because it has been my privilege in Washington to help out some in arranging for all these discussions—that our presentation has been divided.

A very important part of our presentation was made by General Grant the other day when you were called out.

Senator ANDERSON. I was sorry about that. I was hoping to be here but I had a meeting of the Joint Committee on Atomic Energy that I could not separate myself from.

Mr. ZAHNISER. I hope you do have an opportunity to study his presentation because that possibility of alternatives is the very point that he made. Because of General Grant's long experience in engineering work I have great confidence in that. Our opinion formed in the Wilderness Society is based, with regard to the unnecessary character of the Echo Park Dam, largely on General Grant's presentation. So we have attempted to make these positive recommendations.

While we feel that the Echo Park Dam is not necessary and were puzzled a year ago at the statements that the evaporation factor required it, lately we haven't heard so much of that. Instead we have heard arguments that this would be a better playground with the reservoir in than if it were out.

That has disturbed us greatly because that involves a change in the very concept of what a national park is. We like playgrounds. We appreciate the recreational value of reservoirs. In favoring the upper Colorado River project we favor something we believe is going to result in a great many reservoirs where that sort of recreation will be available, but in the national park system as in the wilderness areas our purposes are different, and I don't need to explain these to you, Senator Anderson, because you understand them very well, I know.

I have talked longer than I wanted to, anyhow. I wonder if I could now have introduced into the record at this point a couple of things that will save me some time. There is a brief newspaper article, Battle Rages Over Building of Echo Park Dam, on which I prepared a comment in a letter to the writer. That article, which is journalistic, and the reply to it, would constitute a statement of our position.

Senator ANDERSON. You have heard me try to keep some things out the other day, but I believe this is pertinent and proper and I will include the original news story from the Washington Post and Times Herald of Thursday, November 11, 1954, plus the reply of Mr. Zahniser to Mr. Steel of the New York Herald Tribune News Service dated November 12, 1954, in the record at this point.

(Documents referred to follow:)

THE WILDERNESS SOCIETY,
Washington, D. C., November 12, 1954.

Mr. A. T. STEELE,
New York Herald Tribune News Service,
New York Herald Tribune, New York, N. Y.

DEAR MR. STEELE: I have read with interest and admiration your Vernal, Utah, dispatch Battle Rages over Building of Echo Dam as it appeared in the November 11, 1954, issue of the Washington Post and Times Herald and want to express my appreciation of the way in which you have contributed to a better public understanding of this highly controversial question.

But may I comment further, that one of the most important matters here at issue is the integrity of the national park system and that, while this may seem intangible and perhaps difficult to define as clearly as you have pointed out other aspects of the controversy, it is of deep and far-reaching significance.

With regard to the building of dams you very helpfully explain that "it is not the principle that is in dispute" but "whether or not there is any satisfactory substitute for the Echo Park project." We conservationists certainly agree (and have so insisted again and again) that we do not object to dams, or to reclamation, or to water storage for power production but to the choice of the particular site for the Echo Park (and Split Mountain) impoundment, in the Dinosaur National Monument. You do conservation a service by emphasizing this.

There is, however, a principle involved with regard to the national park system. It is the principle that once an area has been set aside for preservation it should be held inviolate and used for commodity purposes only in the case of extreme national need. Former Secretary of the Interior Julius A. Krug once stated this principle, in its application to dams, as follows: "Large power and flood-control projects should not be recommended for construction in national parks, unless the need for such projects is so pressing that the economic stability of our country, or its existence, would be endangered without them." In opposing the proposed Echo Park Dam in the Dinosaur National Monument conservationists are most deeply concerned with this principle of the integrity of the national park system.

The proponents of the Echo Park Dam seem to be deeply conscious that the controversy is in large measure over this principle. There are, indeed, indications that the persistent advocacy of the Echo Park Dam is intended to break down this principle, reverse the national policy for park preservation, and secure for those who are responsible for impoundment projects the freedom to use any national park system site that seems advantageous. Not only do we know that similar proposals are pending in other areas in the park system but we have also such indications as the comment by Representative Wayne N. Aspinall to his colleagues on the House Subcommittee on Irrigation and Reclamation that if we take out the Echo Park Dam now we will give conservationists medicine that they will use against us for 100 years.

It seems clear to me, after studying this issue now for 5 years, that on both sides it is well recognized that what is principally at stake is our national policy with reference to the areas set aside for preservation. As I pointed out in a statement presented to the Senate Subcommittee on Irrigation and Reclamation in behalf of the Wilderness Society:

We have sought to emphasize, not only that the upper Colorado River program can be realized along with the preservation of the Dinosaur National Monument, but also that our only way of preserving any such areas throughout our land is by dedicating them and not allowing any destruction. Our whole American policy for preserving some of our wilderness is, in fact, based on two understandings that are here involved. On the one hand is the understanding that our land and water resources are great enough and varied enough to make possible the preservation of a system of wilderness areas without sacrificing the commodity production and other uses that make it necessary to develop most of our areas. On the other hand, our wilderness preservation program is based on the understanding that our civilization is such that no lands will persist unexploited except those that are deliberately set aside and faithfully protected. For this policy to prevail we must be faithful in respecting our dedications, for otherwise the dedicated areas will inevitably disappear one by one as it seems profitable to exploit them. We can not merely set aside an area until we get to it with some kind of exploitation project without defrauding both our own and future generations.

To permit the would-be exploiters of Dinosaur National Monument to build the Echo Park and Split Mountain Dams would certainly jeopardize this public policy of national park preservation. Rather than place this great and brilliant policy of the American people in such jeopardy let us instead strengthen it by reasserting our adherence to it and our determination that it must be respected. If we turn back now this threatened invasion, by reaffirming the sanctity of the areas which the Nation has dedicated for preservation, we can be sure that the wilderness, wild, primitive, and roadless areas will, indeed, be safeguarded more surely than ever.

We cannot avoid setting precedents. We can only do our best to see that the precedents which we do set are sound.

If you should see fit to write further on this controversy, I feel certain that you will still further clarify public thinking by pointing out this great debate thus going on over our national policy of park preservation.

Sincerely yours,

HOWARD ZAHNISER,
Executive Secretary and Editor.

[From Washington Post and Times Herald, Nov. 11, 1954]

BATTLE RAGES OVER BUILDING OF ECHO DAM

VERNAL, Utah.—After a look into the Dinosaur National Monument near here, one can understand why so much commotion is being raised, pro and con, over the proposed Echo Park Dam.

The site of the proposed dam lies near the center of a national preserve of great natural beauty. If the dam were built the scenery would be altered, to say the least. But with equal certainty it can be said that the dam would bring great benefit to the people of the intermountain region.

The Echo Park Dam is a controversial feature of the Colorado River storage project. This vast scheme envisages construction of a series of dams in the upper Colorado River Basin for the storage, regulation, and use of the waters of the area. Worried over nature-group opposition to the Echo Park project, public and private interests in Utah are beginning an intensified campaign to obtain favorable action in the next session of Congress. This town, close to the site, is extremely active in the fight.

IMPAIRMENT TO BE LARGE

The extent to which the Echo Park Reservoir would affect the natural beauty and uniqueness of the Dinosaur National Monument is a matter of opinion; but there is little doubt that the impairment would be considerable. However, the dinosaur remains, which give the monument its name, would not be affected. They lie in a small area at the western end of the preserve.

This writer has just completed an automobile trip to the dam site area—a ride of about 58 miles, much of it over poor dirt roads. From Harper's Corner (elevation 7,500 feet) one looks down on a scene of wild and rugged beauty. There the Green and Yampa Rivers meet in a labrynthine confusion of winding gorges, sheer cliffs, and blazing color. At the bottom, nearly half a mile below, the rivers can be seen as segments of brown ribbon. And Echo Park itself shows plainly as a flat green patch all but encircled by yellow cliffs. The cavity is better known locally as Pat's Hole—named for a long-haired eccentric who once lived in its depths.

WOULD BECOME FIORDS

This is the heart of the scenic area of the Dinosaur National Monument and it is the part that would be most seriously affected by the construction of Echo Park Dam. The dam would back up water to a depth of nearly 500 feet in the vicinity of Pat's Hole and would cover the floor of the Green and Yampa River canyons at varying depths for distances of 63 miles and 44 miles, respectively. The effect would be to convert a network of deep canyons into a network of fiords. The wild lower recesses of the inundated canyons would give way to wall-lined corridors of placid water. And the sport of riding the rapids through these gorges—which is one of the area's special attractions—would be no more.

To be sure, the greater part of the scenery of the monument would remain above water, and the region would still have great scenic charm. But a part of its uniqueness would be gone. Supporters of the project counter this by pointing out that creation of a lake would make the innermost recesses of the monument more accessible (by boat) to the general public.

The Sierra Club, which is taking a lead opposition to the Echo Park project, has tried hard to promote interest in the boat trips through the Yampa and Green River gorges. A registration book kept in Pat's Hole by the National Park Service contains some salty comments, for and against the dam, from visiting tourists.

"Damn the dam," writes one. "Save this beautiful canyon," writes another. And a punster has his say with: "Don't tampa with the Yampa." Most such comments seem to come from Californians. But a disgruntled New Yorker observes: "Why irrigate more land to grow excess crops?" Another visitor says:

"I say build it!" And here is the comment of a party from Arkansas: "We are not against Government building of multipurpose dams, but we surely hope an alternative site can be found."

The Echo Park Dam would cost in the neighborhood of $139 million. It has been described by experts as the wheelhorse of the Colorado River storage project. Water is without a doubt the foremost need of the intermountain region; and the demand for power is growing by leaps and bounds. Hence the maximum utilization of the waters of Colorado Basin is both necessary and inevitable in the long run.

This is generally agreed: It is not the principle that is in dispute. The main question at issue is whether or not there is any satisfactory substitute for the Echo Park project—a substitute that would accomplish the same overall purpose without affecting a national park or monument. Supporters of the scheme say "no"; opponents say "yes."

The next Congress will be called upon to make a decision between the conflicting viewpoints.

Mr. ZAHNISER. Then I had prepared a statement in the form of a letter to the editor of the Washington Post and Times Herald that comments on the agreements that Senator Watkins asked about this morning, and I would be glad to have that introduced in the record at this point.

Senator ANDERSON. I will do that because I am anxious to read that myself, and therefore this letter of December 9 will be included in the record.

(The document referred to follows:)

WASHINGTON 7, D. C., *December 9, 1954.*

EDITOR, THE WASHINGTON POST AND TIMES-HERALD,
Washington 5, D. C.

DEAR SIR: In his letter published in the Washington Post and Times-Herald for Sunday, December 5, Mr. Richard R. Ryan, of Farmington, N. Mex., reasserts an old argument that the proposed Echo Park Dam might be justified as an invasion of the Dinosaur National Monument by a 1936 agreement between the National Park Service and the people of this region.

I have been particularly sensitive to the claim that we who oppose the Echo Park and Split Mountain Dam proposals are in danger of breaking faith with the people of this region.

I have read with deep interest David H. Madsen's March 27, 1950, affidavit regarding the June 11, 1936, and June 13, 1936, public meetings at Vernal, Utah, and Craig, Colo., at which, he testified, he then authoritatively stated, as a representative of the National Park Service, "that in the event it became necessary to construct a project or projects for power or irrigation in order to develop that part of the States of Colorado and Utah, that the establishment of the monument would not interfere with such development."

I have read also with deep interest the March 27, 1950, affidavits by J. A. Cheney, Joseph Haslem, Leo Calder, H. E. Seeley, and B. H. Stringham regarding one or both of these meetings, at which they said, each with the same words, that "the National Park Service representative assured the residents of these areas that if the Dinosaur National Monument were enlarged that the National Park Service would not prevent or stand in the way of future reclamation projects on the Green River or the Yampa River within the boundaries of the Dinosaur National Monument, for irrigation or power purposes."

It has been pointed out by others that such assurance could not have been given responsibly and authoritatively, because the letter of instructions from the Secretary of the Interior of June 8, 1936, expressly prohibited the National Park Service from making commitments on the subject of water development at the hearings.

Nevertheless, I have still been disposed, personally, to have a regard for these discussions testified to by Mr. Madsen and these other residents of Utah, to try to look at this situation from the viewpoint of these people's own understanding, and to feel a moral responsibility to abide by the outcome of such agreements as were understood.

I am without any belief whatever that they justify approval of the Echo Park or Split Mountain Dam.

The outcome of the discussions and considerations of which these meetings and so-called agreements were a part was the proclamation establishing the Dinosaur National Monument as we know it today.

We have in this country what I believe is an excellent democratic process of discussing extensively (and intensively) all aspects of any proposed public action. Then the various points of view are resolved in some definite action. We adopt a constitution. We enact a law. We have a Presidential proclamation. Then we pass on to future discussions of other problems with our past discussions and agreements made formal and finally resolved in writing—for our clear understaning not only at the time but in the future.

Such was the Presidential proclamation of 1938. Some 2 years after the 1936 public hearings and following various governmental considerations, this proclamation did enlarge the monument, did take the action that had been debated in 1936. At the same time it included and defined the public understanding regarding reservoir projects, as follows:

"This reservation * * * shall not affect the operation of the Federal Power Act of June 10, 1920 (41 Stat. 1063), as amended, and the administration of the monument shall be subject to the reclamation withdrawal of October 17, 1904, for the Brown's Park Reservoir site in connection with the Green River project."

There is no evidence of any dissatisfaction with this statement—no evidence at all that provision for the Brown's Park Reservoir site was not an adequate recognition of such assurances as were understood. The proclamation's reservation was, and is, specific. It applies to a site and an area many miles up the river from the sites now being argued. And Congress, by appropriating for and providing for the administration of the monument has, in effect, repeatedly endorsed this proclamation.

I can only conclude that we have in this respect no obligation to the people of this region other than our obligation to respect this proclamation's provision that the administration of the area is subject to a prior withdrawal for the Brown's Park Reservoir site. As Secretary of the Interior Douglas McKay himself said, in my hearing, tapping the edge of his desk with his index finger, "Just because I give somebody permission to do something at this desk, it doesn't mean that he can do it anywhere in the room." Wrong as Secretary McKay is, in my opinion, in supporting the Echo Park Dam proposal, he did thus recognize that it is not authorized in the proclamation that establishes the national monument.

We are thus in no sense breaking faith with the people of this region in urging the preservation of this area.

In emphasizing this I should like also, in as friendly a fashion as possible, to remind the people of Utah and Colorado that all of us from all parts of the country share with them the public ownership of this unit in our national park system, and I would appeal to them to recognize that they have a responsibility to all of us for its protection.

I recognize that our national welfare depends on the welfare of this region, and I feel that my own personal welfare is related to the personal welfare of my fellow citizens in Utah and Colorado. I am interested in the national importance of the upper Colorado River program for the benefit of this region and its people.

At the same time I would urge all of them to keep faith with all of us throughout the Nation, and with those of future generations, by cherishing these scenic wild canyons and helping to preserve them unimpaired.

Sincerely yours,

HOWARD ZAHNISER,
Executive Secretary and Editor.

Mr. ZAHNISER. Pertinent to that and only in its rough draft form is a little statement that has to do with Federal Power Commission matters. I know it is——

Senator ANDERSON. It is how long?

Mr. ZAHNISER. Triple-spaced 5 pages, and much cut out. I should like to read that because you might wish to comment on it, if it isn't too late. It is the sort of thing I know you enjoy thinking about.

By act of August 26, 1935 (49 Stat. 838), the Federal Power Commission's authority was changed significantly. In the 1920 act, the Commission was given authority to issue licenses for the con-

struction of dams on "public lands and reservations of the United States," and "reservations" was so defined that it included national monuments and national parks.

The 1935 amendment changed the definition of "reservations" to read that it "shall not include national monuments or national parks."

This restriction of the Federal Power Commission's fundamental authority would seem to leave no room for interpretation. However, in a memorandum prepared by Mr. George W. Abbott, committee counsel of the Subcommittee on Irrigation and Reclamation of the Committee on Interior and Insular Affairs of the House of Representatives, printed in the 1954 House hearings on H. R. 4449, 4443, and 4463, at page 719 and following, it seems to be contended that the Federal Power Commission has the present authority to issue a license for the construction of the dam in the Dinosaur National Monument without further congressional approval.

Mr. Abbott's argument is that the clear language of the 1935 amendment to the definition of "reservations" does not mean what it says. He argues that the language "shall not include national monuments or national parks" means that "reservations" shall not include the parks in existence on March 3, 1921, as then constituted.

This conclusion is reached by a strained interpretation of a further provision in the 1935 act that provided:

> That nothing in [the 1920] Act, as amended, shall be construed to repeal or amend the provisions of the amendment to the Federal Water Power Act approved March 3, 1921 (41 Stat. 1353), or the provisions of any other Act referring to national parks and national monuments.

The purpose of this provision in the 1935 act was made quite clear by its author, Mr. Crosser, of Ohio, who said in the House debate—

> The national parks organization wants to make sure that the bill does not infringe upon their preserve, so to speak. We are offering this at their request.

(See House hearings referred to above, on p. 730.)

Mr. Abbott in his memorandum construes this amendment, offered at the request of the national parks organization, to nullify the clear language of the redefinition of "reservations," which on its face removed any authority of the Federal Power Commission to issue licenses for the construction of dams in national parks and monuments.

The purpose of the amendment submitted by Mr. Crosser, of Ohio, was not to give authority to the Federal Power Commission to build dams in present or future parks or monuments. On the contrary, its purpose was to strengthen the clear language of the redefinition of "reservations" which removed the Federal Power Commission's authority from any and all parks and monuments.

The Crosser amendment may perhaps now be seen to be the product of overcaution, but to construe it as intending to give the Federal Power Commission authority it otherwise would not have had, and contrary to the purposes of its proponents, is obviously a distortion.

The Abbott memorandum relies on language in the 1921 amendment to the Federal Power Act of 1920, which first established the national policy from which Congress has never deviated—that national parks and national monuments shall be immune from the construction of dams. No such limitation was contained in the original 1920 act. The 1921 provision was as follows:

Provided further, That after March 3, 1921, no permit, license, lease, or authorization for dams, conduits, reservoirs, powerhouses, transmission lines, or other works for storage or carriage of water, or for the development, transmission, or utilization of power, within the limits as constituted March 3, 1921, of any national park or national monument shall be granted or made without specific authority of Congress, and so much (of the Act of 1920) as authorizes licensing such uses of existing national parks and national monuments by the Federal Power Commission is hereby repealed.

This salutary national policy has never been changed. It is true that the policy was expressly limited in 1921 to the parks and monuments then in existence and as then constituted. The proponents of the provision reluctantly included the words "as constituted" and "existing" in order to assure passage of the bill. (See pp. 724 to 725 of the House hearings, quoted already.) They rightly felt that at that time it was more important to establish the national policy as to the parks and monuments as they then existed and wait until future parks and monuments were created before trying to extend the policy to them.

They proved to be farsighted. The policy has never been abandoned.

The 1935 amendment, nevertheless, went to the very heart of the Federal Power Commission's authority by changing the definition of "reservations" to exclude parks and monuments. There was no longer any need for the 1921 provision, and it was eliminated. It is not a part of the act.

However, the Crosser amendment became part of the 1935 act as a result of an effort to be doubly cautious in protection of national monuments and parks. The Abbott memorandum to which I referred improperly, in our opinion, construes this as intending to preserve the "as constituted" and "existing" language of the 1921 provision, which would not have been preserved with the redefinition of "reservations" without the Crosser amendment.

It is inconceivable that this could have been the purpose of the Crosser amendment. Its sole purpose was to assure that the policy of the 1921 amendment which immunized parks and monuments from invasion by the Federal Power Commission was continued. Certainly it could not have been intended to preserve any limitations on the park preservation policy.

Thus the provision in the Presidential proclamation of July 14, 1938, enlarging the Dinosaur National Monument which provides that "this reservation shall not affect the operation of the Federal Water Power Act of 1921 (41 Stat. 1963), as amended," did not mean that the Federal Power Commission could authorize the construction of a dam in the Dinosaur National Monument. Any such authority of the Federal Power Commission is controlled by Congress, and Congress determined in 1935 that the Federal Power Commission could not authorize a construction of dams in a national monument.

To deviate from that policy would establish a dangerous precedent.

Just to conclude in behalf of the Wilderness Society, I should like to reiterate that we wish to see this national policy for preserving these areas respected here. We know we cannot help setting precedents. Whatever we do, we set a precedent. We want to set a sound and strong precedent. This controversy has been going on for a considerable time. It has attracted widespread attention. If we preserve this policy that I have been trying to defend here at this time,

we shall make it stronger than it ever has been before. That is our hope.

Our recommendation on this bill that you have invited our consideration of, is (1) that the Echo Park Dam be eliminated, (2) that there be put in a proviso that the Glen Canyon Dam be so built as to protect the Rainbow Bridge National Monument, and (3) that a proviso or amendment be put in this basic longtime authorization of what we hope will be a successful upper Colorado River project to the effect that no dam authorized by it shall be so constructed as to be within, or to affect the features within, any area in the national park system.

That I trust is a positive recommendation, and I appreciate very much your kindness to me and in behalf of the others—your kindness to all.

Thank you.

Senator ANDERSON. Thank you.

STATEMENT OF C. R. GUTERMUTH, VICE PRESIDENT, WILDLIFE MANAGEMENT INSTITUTE

Mr. GUTERMUTH. My name is C. R. Gutermuth. I am vice president of the Wildlife Management Institute, one of the oldest national conservation organizations in North America. The institute is dedicated to the better management and wise utilization of all renewable natural resources in the public interest, and its nonprofit activities have been continuing since 1911.

We appreciate the invitation of this subcommittee to present a statement concerning S. 500, which would authorize the Secretary of the Interior to construct, operate, and maintain the upper Colorado River storage project. In your invitation, Mr. Chairman, you requested that the testimony be restricted as much as possible to new information supplementary to statements presented relative to S. 1555, reported to the Senate in 1954, inasmuch as the two bills are identical—and that means that this statement can be brief. In fact, it might really be ended here by stating again, emphatically—there is no justification for Echo Park Dam.

There has been no change in the attitude of the Wildlife Management Institute in respect to the upper Colorado River storage project. While we recognize that some features of the overall project may be needed, we still are unalterably opposed to the inclusion of Echo Park Dam in the initial phase of this program. We feel that Dinosaur National Monument is an invaluable part of the national park system. The proponents of Echo Park Dam never have given adequate justification for the selection of this dam site over available sites outside the national monument that could provide comparable storage facilities.

Nothing has happened in the past year to cause us, and the majority of other national conservation organizations, to alter our views in this regard. The only new development in the picture has been an organized campaign on the part of the proponents of Echo Park Dam to throw up a smokescreen in an effort to deceive the public into thinking that the proposed reservoir will become an outstanding recreational area.

An extremely attractive and lavishly illustrated brochure, printed and distributed widely by the Upper Colorado River Commission, contains propaganda that is as deceptive as it is flowery. It promises a future "playground for America's millions" with superb bass fishing, bathing beauties, and all of the other features of a mass recreation area. Its major objective is to create the impression that their plan is consistent with the laws and policies under which the National Park Service was created and operates.

The brochure conveniently overlooks many facts. Those ruinous fluctuating water levels, and their resulting miles of unsightly and foul-smelling mud flats, are not mentioned. Moreover, the cold water in that proposed high-elevation reservoir will not afford either good fishing or good bathing. That ill-conceived publication still contends that the conservationists are interested only in preserving the dinosaur quarries, when the authors themselves know that no representative of any national conservation organization ever made such a statement before this subcommittee, nor any other congressional committee that has considered legislation effecting that area. The repeated reference to that misconception, in view of the fact that the quarries lie well downstream from the proposed dam site, is made for no other reason than to deceive and confuse the public.

To build Echo Park Dam in that national monument definitely would pose a threat to the entire national park system. The Bureau of Reclamation, by its own admission, never has made an adequate evaluation of the alternate dam sites outside the monument. Competent engineering authorities have shown repeatedly that those sites are feasible and, by the belated admission of the Bureau of Reclamation itself, reservoirs outside would have no more than a slightly larger evaporation loss than the particular one that the Bureau insists upon having. It was on the basis of evaporation loss that those alternative sites were ruled out by the Bureau of Reclamation, before its estimates were revised downward so drastically.

The repeated insistence of the proponents upon retaining Echo Park Dam in the upper Colorado River storage project appears to be based entirely upon a desire by the Bureau of Reclamation to get its foot in the national parks. To one who has been close to this problem for many years, few other conclusions can be read into the refusal of a public agency to consider alternative sites after being forced to admit a 70 percent error in its own calculations of evaporation-loss differential.

As to the recreational opportunities available in the Dinosaur National Monument, even in its unimproved state—well, the scenery and boating attracted many thousands last year and nearly 1,000 made the long float trip through the superb canyons of the Green and Yampa Rivers within the monument. This happened in spite of the fact that the roads to the monument are poor and the existing facilities are woefully inadequate.

As an added inducement to get permission to destroy those scenic wonders, the Secretary of Interior said that if Echo Park Dam is built, it is proposed that $21 million will be spent to attempt to make it a "playground for millions." That is something, coming from the one who is supposed to preserve our national park system for us and those to follow. The fact is, only a small fraction of that amount spent in building roads would make the monument as it exists today

accessible and attractive to millions of cross-country tourists. We believe that this can and should be done without building the dam, which will cost the taxpayers of every State at least $176 million. If that dam is built, as a part of the billion-dollar project, the scenic canyons will be destroyed, along with the unique character of the area, its attraction to tourists, and its value as a potential national park.

Mr. Chairman, it is amazing that the residents of Colorado and Utah cannot realize that they could have both the extraordinary attractions of that fascinating wonderland and a dam at another location.

Senator ANDERSON. We will close the hearings at this time.

I offer for the record the following quotation from the report of the Metropolitan Water District of Southern California for October 1950. It consists of a statement by Mr. Julian Hinds, who was at that time the chief engineer and general manager of the Metropolitan Water District of Southern California. I have italicized salient sentences of this extract:

QUALITY OF COLORADO RIVER WATER

Of equal importance with quantity is the quality of Colorado River water and its acceptability for the many uses for which it is required. Prior to the construction of Hoover Dam, the river was heavily laden with silt; but this silt settles readily upon storage. *The outflow from Lake Mead is clear and sparkling, and silt picked up after release is easily removed by further settlement. The clarified water is free from bacterial contamination and because of the uninhabitable mountain and desert drainage areas surrounding the reservoir, contamination never will be a serious problem.*

The quantity and quality of solids dissolved solids in the unregulated river varied with the flow and ranged from less than 300 parts per million during floods to about 1,000 parts per million at low flow. Lake Mead equalizes this variation to an average mineral content of about 600 parts per million. Those minerals which cause hardness average about 300 ppm.

Boron and fluorine are not present in harmful amounts. In addition to chemical tests, the suitability of Colorado River water for agricultural use is demonstrated by its long and successful application to citrus groves in the Imperial Valley of California and on the Yuma project in Arizona. The absence of fluorine in harmful amounts is attested by the domestic use of the water in the same areas, as well as by many laboratory analyses.

Conservation of the relatively soft floodwaters, formerly wasting into the sea, more than offsets any increase in average salinity caused by evaporation from Lake Mead. *Exhaustive studies show that the mineral content under the most unfavorable future conditions will be lower than the average for waters diverted and successfully used in the Yuma and Imperial Valleys prior to the construction of Hoover Dam.*

It is fully established that the water of the Colorado River is of high quality, except for a fairly high percentage of hardness which can be removed at a reasonably low cost.

Julian Hinds is an outstanding engineer and an authority on the Colorado River.

(The following letter was received from Governor Johnson subsequent to the close of the hearings:)

THE STATE OF COLORADO,
EXECUTIVE CHAMBERS,
Denver, March 7, 1955.

HON. CLINTON ANDERSON,
Chairman, Interior Subcommittee, Washington, D. C.

DEAR CLINTON: Please permit me to express to you and your fine committee my deep gratitude for the courteous and pleasant reception you gave me and for the generous patience with which you listened to me.

I am afraid I did a poor job of getting my points over. Please remember that as Governor I am having a very difficult time with the eastern and western slopes on the Colorado River problems. I am trying desperately to work out this matter equitably and amicably and to the advantage of both Slopes. Even Solomon would have trouble doing that.

I hope, therefore, you will permit me to say one more word on at least one point which I tried to clarify without success. Perhaps I have read and reread the language of the seven State compact too often. I think there is such a danger when one not versed in law studies a legal document. I hope most earnestly that my conclusions are in error and that some of the fine print in this compact is not binding. Nevertheless, I am completely convinced that in due course the courts will find that, in perpetuity the priorities on the river, run as follows:

(1) The adjudicated water rights in the Colorado River from its source to its mouth in effect when the compact was signed are not disturbed by the compact;

(2) One million five hundred thousand acre-feet must go annually to Old Mexico;

(3) Seventy-five million acre-feet during each 10-year period must be delivered by the upper basin States to the lower basin States at Lee Ferry;

(4) The consumptive use of 7,500,000 acre-feet of such water as remains is then allocated to the 5 upper basin States;

(5) One million acre-feet from the Colorado River system finally is allocated to the 3 lower basin States.

To me this division of the water of the river in this order of priority appears definite and crystal clear.

I wish I could believe that the upper basin States had an equal priority with respect to the annual consumptive use of 7,500,000 acre-feet with the lower basin States. If I could think for one split second that the upper basin States had such a right in perpetuity, I would not worry about Colorado's water situation. I would know positively that when she got around to it, she could put her share of that much water to beneficial use. Furthermore there would be a greatly diminished problem between the eastern and western slopes since there would be plenty of water for both; 51.75 percent of 7,500,000 acre-feet is 3,881,250 acre-feet and under such an interpretation Colorado would be assured of that much consumptive use, since Colorado's contribution to the Colorado river system varies from 9 to 12 million acre-feet annually.

You may be certain that under such an interpretation I would not take the time to appear before any committee of Congress pleading for equal treatment with our upper Colorado Basin associates. Our rightful apportionment of the waters of the Colorado River would be assured in perpetuity and what a comfortable feeling that would be.

I say this so that you might know how precarious Colorado feels her situation to be under the interpretation of the Colorado compact which I am forced to accept by its clearly written provisions and terms. Colorado does not like those terms at all, but we must face the facts. We would merely fool ourselves to calculate otherwise.

The implications of these hard facts have placed Colorado in a deplorable situation with respect to our upper Colorado Basin neighbors. Water is life in Colorado so is reality we are fighting for our very lives.

I am most grateful to you for your great patience.

Sincerely,

ED. C. JOHNSON.

(By direction of the chairman the following is made a part of the record:)

UNITED STATES SENATE,
COMMITTEE ON POST OFFICE AND CIVIL SERVICE,
March 1, 1955.

Hon. JAMES E. MURRAY,
Chairman, Senate Committee on Interior and Insular Affairs,
United States Senate, Washington, D. C.

DEAR SENATOR: I am enclosing a copy of a resolution recently adopted by the Rhode Island Wildlife Federation in which the federation has gone on record as

being opposed to the erection of Echo Park Dam in the upper Colorado storage project.

I would appreciate it if you would have the views of this organization entered as part of the record.

With warmest personal regards, I am

Sincerely yours,

JOHN O. PASTORE, *United States Senator.*

A RESOLUTION ON THE UPPER COLORADO STORAGE PROJECT

Whereas it is the concensus of all the principal conservation organizations in this country that Dinosaur National Monument in Colorado has unique scenic values which would be needlessly destroyed by the erection of a proposed Echo Park Dam; and

Whereas the United States Bureau of Reclamation, President Dwight D. Eisenhower, and all others who now favor this dam have never satisfactorily answered the criticisms directed against the Bureau's plans by conservationists, nor demonstrated that an alternative site which would not damage the values of Dinosaur National Monument is incompatible with the water needs of that mountain region: Now, therefore, be it

Resolved, That the Rhode Island Wildlife Federation, at its 18th annual meeting held in East Providence, R. I., on this 12th day of February 1955, go on record as opposing the erection of Echo Park Dam in the upper Colorado storage project and urge Rhode Island's Representatives in the United States Senate to do everything in their power to defeat Senate bill 500 affecting this move, and direct that the Senate Subcommittee on Irrigation and Reclamation be advised of this opposition in time for the public hearing to be held in Washington, D. C., on February 28 next.

UNITED STATES SENATE,
COMMITTEE ON APPROPRIATIONS,
March 7, 1955.

Hon. CLINTON P. ANDERSON,
Chairman, Subcommittee on Irrigation and Reclamation,
Senate Committee on Interior and Insular Affairs,
Senate Office Building, Washington 25, D. C.

DEAR CLINT: I have just received a copy of a letter addressed to you on March 1 by Hon. Sidney Kartus, Arizona House of Representatives, in which he requested you to print his letter and a copy of House Joint Memorial No. 7 introduced by him in the current session of the Arizona Legislature, urging Congress that Arizona's Glen Canyon Dam not be included in the upper Colorado River storage project and that no exportations of water from the river basin be authorized by such project.

I have replied to Mr. Kartus as indicated by the attached copy of my letter to him dated today. As you can see I am not in agreement with Mr. Kartus, but I see no reason why the record on the upper Colorado River storage project should not include his protest.

With kindest regards, I am

Yours very sincerely,

CARL HAYDEN.

UNITED STATES SENATE,
COMMITTEE ON APPROPRIATIONS,
March 7, 1955.

Hon. SIDNEY KARTUS,
Phoenix, Ariz.

DEAR KARTUS: I have never thought that the Colter filings were worth the paper used in making them and so informed Fred years ago. However, there can be nothing lost or gained by printing your reference to them in the hearings, and I shall ask that it be done as requested in your letter of March 1.

Sincerely,

CARL HAYDEN.

HOUSE OF REPRESENTATIVES,
STATE OF ARIZONA,
March 1, 1955.

SENATE INTERIOR AFFAIRS COMMITTEE, SUBCOMMITTEE ON UPPER COLORADO STORAGE PROJECT BILL,
Senate Office Building, Washington, D. C.

GENTLEMEN: With regard to the upper Colorado River storage project bill on which hearings are now being held by your subcommittee, I protest against including in this project any units which would export water from the basin of the Colorado River, and I protest, also, against Arizona's Glen Canyon Dam being absorbed into and being made a part of this project.

The Glen Canyon Dam is a part of Arizona's Glen-Bridge-Verde-Highline project under the Colter filings to divert the water of the river by gravity into the central valleys of Arizona and for other areas of Arizona by exchange.

I am attaching hereto a copy of House Joint Memorial No. 7, which I have introduced in the present regular session of the 22d legislature, in which I am a member of the house and a member of the house committees on irrigation and agriculture and public lands. I request that this letter and the attached House Joint Memorial No. 7 be placed in the record of the hearings.

Sincerely yours,

SIDNEY KARTUS,
Representative, Maricopa County.

[State of Arizona, House of Representatives, Twenty-second Legislature, First Regular Session]

H. J. M. 7

Introduced by Mr. Kartus, of Maricopa

A JOINT MEMORIAL Urging Congress that Arizona's Glen Canyon Dam not be included in the upper Colorado River storage project, and that no exportations of water from the river basin be authorized by such project

To the Congress of the United States:

Your memorialist respectfully represents:

Of all the large river basins in the nation, that of the Colorado River is the most water deficient. The limited water which it possesses has been and is now the subject of litigation between the states of the basin. Despite this fact, there is now pending before Congress a bill to authorize the upper Colorado River storage project which proposes to export from the Colorado River Basin by transmountain diversion some five million acre-feet, or nearly one-third of the main stream water.

The waters in question are among those appropriated since 1923 by the Colter water filings on behalf of the State and people of Arizona to develop several million electrical horsepower and several million acres of land in Arizona, within the river's basin.

The water tables in all major pump-irrigated areas in central Arizona are being seriously lowered every year. If present irrigated areas in central Arizona are not to be drastically reduced, an adequate amount of Colorado River water must be brought into central Arizona, which will be impossible if such exportations of waters from the basin are authorized.

We further protest that the proposed project calls for the construction of Glen Canyon Dam within Arizona, but that power and power revenues from such dam are proposed to go to the upper basin states to finance nine projects for such water exportations to the total exclusion of any benefits whatever to Arizona from this dam on her own soil. The water storage and power potentialities of the Glen Canyon Dam are embraced within the prior Colter filings, and rights thereto are vested in the people of Arizona.

There is no objection to the construction by the upper basin states of units of the proposed project which call for reasonable use of water entirely within the watershed of the Colorado River in those states. Such units will benefit the upper basin states and the reflow water therefrom will return to the river for use in Arizona and other lower areas. Wherefore your memorialist, the Legislature of the State of Arizona, prays:

1. That the Congress refuse to authorize any units of the upper Colorado River storage project which would export water from the basin of the Colorado River; and

2. That the Congress refuse to permit Arizona's Glen Canyon Dam to be absorbed into this project, since the Glen Canyon Dam is part of the Glen-Bridge-Verde-Highline project to divert the water of the river into the central valleys of Arizona and for other areas of this state by exchange.

INDIAN RIGHTS ASSOCIATION,
Philadelphia, March 3, 1955.

Hon. CLINTON P. ANDERSON,
Chairman, Subcommittee on Irrigation,
United States Senate, Washington, D. C.

MY DEAR SENATOR ANDERSON: At its regular meeting, held yesterday, the board of directors of the Indian Rights Association went on record in support of the Navaho project of the Colorado River storage project. The association urges that the Navaho project be definitely included in any legislation authorizing the development of the water resources of the upper Colorado River Basin.

The need of the Navaho Indians for resources to enable a larger number of members of the tribe to earn a living on their reservation is fully recognized. Many thousands of Navahos should be enabled to support themselves from the use of their land to be irrigated through the Navaho project. The Navahos are entitled to first consideration in the use of the waters of the upper Colorado River Basin.

We urge the inclusion of the full Navaho project in any provisions for the upper Colorado development.

Sincerely,

LAWRENCE E. LINDLEY,
General Secretary.

ASSOCIATION ON AMERICAN INDIAN AFFAIRS, INC.,
SANTA FE, N. MEX., *March 8, 1955.*

Hon. CLINTON P. ANDERSON,
Chairman, Subcommittee on Irrigation and Reclamation,
Committee on Interior and Insular Affairs,
United States Senate, Washington, D. C.

DEAR SENATOR ANDERSON: Understanding that the Subcommittee on Irrigation and Reclamation has concluded its hearings on S. 500, the bill to authorize the construction and operation of the Colorado River storage project, I respectfully bring to your attention the following statement of the position of the Association on American Indian Affairs on this bill. This association's primary concern, of course, is that the bill, when passed, will authorize construction and operation of the Shiprock-San Juan-Chama projects. I know that Mr. Zimmerman, on behalf of the association, has already testified briefly in support of these related projects, but I ask that this letter be also included in the record.

The Association on American Indian Affairs is deeply interested in these proposals because of their effect upon the Indians of New Mexico, and especially the Navaho Indians. The Navaho Tribe, with a population of about 75,000 people at the present time, increasing at a rate of close to 1,500 per year, have long been a subject of special concern to the Congress, the Executive, and the Nation at large. Although their reservation is about as large as the State of West Virginia, it is so arid, and the land has been so abused through ignorance, that it cannot support even half of the existing population except in a state of utter destitution and semistarvation.

You and all your committee are well aware of these conditions, and know also that the Navahos have been so neglected, so deprived of education, that even today they are largely illiterate and non-English speaking. Despite the best efforts that can be made, it will be a long time, at least several generations, before their difficult problem, made ever more acute by their increase in population, can be solved by any large movement of Navahos off the reservation.

The reclamation projects under the Navaho Dam promise greatly to ease the present critical condition of our greatest Indian tribe, and at the same time, to hasten the day when all members of that tribe can receive a standard American education as well as to reduce the cost of such education markedly.

The physical details of the projects have been presented to you by qualified Government engineers. I confine myself to a brief summation. The Shiprock area now supports about 128 Navaho families, who eke out a poor subsistence by

grazing sheep in a desolation that requires 19 acres to support 1 sheep unit. These 128 families can earn an income of only a few dollars over $1,000 a year per family, or about $200 per capita. They can barely be called self-supporting; certainly the area they occupy is making no contribution to the Navaho Tribe or to the Nation.

It is calculated that the 2 projects, the Shiprock and the south San Juan, will provide 1,400 farms of 90 acres or more; of these 1,100 would be on the Navaho Reservation. That means that 1,400 families, or 7,280 people, can be supported in the area, and supported at a tolerable level of American farm life. To these must be added the additional nonfarming families that will derive a livelihood from the development of a healthily prosperous community. In statements prepared by the Bureau of Indian Affairs, this second group has been estimated at twice the number of farm families, or another 2,800 families. As the Navaho farmers become proficient, as they improve their standards of living and modes of operation, and as, for the reasons stated below, the level of education rises, we may confidently expect that in time well over 20,000 people will be enabled to make a decent, American-level living from these 2 projects. This is a conservative estimate.

The factors of education and health deserve your committee's careful attention. One of the reasons the Navahos are so deprived in both fields is that they live thinly scattered over a wild, rugged, and all but roadless land. Health services can be brought to them, or they to medical centers, only with great difficulty. To give them schooling, the Government has been forced into an expensive and difficult system of boarding schools and semiboarding schools, more than doubling the cost per pupil. Even the simplest and cheapest construction, when boarding facilities are involved, is not only extremely expensive, but so much is required that, build as we may, the Nation has never yet caught up with the needs of the ever-increasing numbers of Navaho children.

The proposed projects would bring at least a fifth of the whole Navaho population into a relatively small area. Concentrated in that area, they could be served entirely by day schools, through high school. The economy would be tremendous. At a saving of $250 per year per pupil, it would amount to almost $1 million a year, without reckoning the initial saving in the capital investment in school construction. It would also facilitate and hasten the process of turning the education of these children over to the State under Johnson-O'Malley Act contracts. Similar economies and advantages would accrue in medical and public health services.

As an ordinary thing in this country, when we contemplate a reclamation project, we think only in terms of the cost of the project as against the value and probable yield of the land to be subjugated. Here we have a unique situation, in that these projects are inseparable from the problem of a shockingly large population of destitute people, underprivileged in every imaginable sense of that word, for which we have been trying to find a solution. In terms of common humanity, in terms of American citizens and the welfare of the Nation, and in terms of cold cash, we have here a situation that calls for a different point of view from the usual. We cannot figure the long-term return to our Treasury solely in terms of the cost of the project and probable ultimate repayments. The savings cut across budget headings and allocations, and when so considered, show these projects to be among the most economical we could possibly undertake.

The Association on American Indian Affairs does not believe in benefiting Indians at the expense of non-Indians, any more than it believes in the reverse. The Shiprock and San Juan projects, as they are now being presented, were in part shaped by consultations between the Navaho Tribe and the State of New Mexico in which both parties showed neighborly awareness of each other's interests. One result of this is the interrelation of these two projects to the proposed San Juan diversion, which would make that share of the waters of the San Juan River that is rightfully New Mexico's and not required by the tribe available to replenish the all too often inadequate flow of the Rio Grande.

This association is interested in that project, as well as the others, since seven of the New Mexico Pueblo tribes depend upon the waters of the Rio Grande, to which they have a right similar to that of the Navahos to the waters of the San Juan. The Indians on the Rio Grande have seen their rights threatened by the demands of downstream users, and they, as well as Americans as a whole, have an interest in seeing the flow of that important river maintained and replenished. An argument has been made that the surplus waters of the San Juan should not be diverted into the Rio Grande, because to do so requires storage and control construction on the tributaries down which those waters would flow, and the

State of New Mexico would use these structures wrongfully to hold back waters. It seems farfetched and picayune.

This association especially hopes that your committee will approve the Shiprock and South San Juan projects, so urgently needed, so obviously rich in their returns to the Nation, so vital to the welfare of our greatest tribe. It does also hold that the related diversion project is beneficial and desirable both to Indians and non-Indians, and should also be approved.

Yours sincerely,

OLIVER LA FARGE,
President.

LOVELAND WILDLIFE ASSOCIATION,
Loveland, Colo., March 4, 1955.

Hon. EUGENE D. MILLIKIN,
Senator from Colorado,
Senate Office Building, Washington, D. C.

DEAR SIR: I have been requested by L. E. Larson, president of Loveland Wildlife Association as legislative chairman of that group to write to you regarding the upper Colorado project, including Echo Park Dam.

The false impression has been widely circulated that all conservation groups are opposed to the construction of Echo Park Dam.

This is definitely untrue, and from our observation, true conservationists who have been fully informed have generally supported this project. Loveland Wildlife Association with 400 members already paid up for 1955, has unanimously voted to support the project, including Echo Park Dam, and we wish our Senators and Congressmen to know that we are strongly behind them in their efforts to secure approval for this project.

It is the strong opinion of several of us who have personally inspected the site of Echo Park Dam that no true conservationist could sincerely oppose the dam on any grounds connected with conservation.

On the contrary, we feel that the greater portion of groups which are supposed to be interested in conservation, and who have opposed Echo Park Dam have been misguided and misinformed.

As I have stated the vote of a general meeting of the Loveland Wildlife Association produced unanimous support, and in every case where I have had the opportunity to observe the effects of real and specific information being presented to fairminded people, including the Colorado Water Conservation Board when I was a member of it, the result of the fair and reasonable consideration of all factors clearly indicates that the construction of Echo Park Dam would be highly beneficial as a conservation measure, and in no important way would it be detrimental.

Respectfully,

JOHN A. CRON.

PUEBLO, COLO., *March 3, 1955.*

Senator CLINTON P. ANDERSON,
Senate Office Building, Washington, D. C.:

Water Development Association of Southeastern Colorado reaffirm endorsement of upper Colorado River project and urge favorable action. Copies of full resolution in airmail today.

M. G. WILLIAMSON,
Executive Secretary-Treasurer.

SEATTLE, WASH., *March 5, 1955.*

CLINTON P. ANDERSON,
Chairman, Senate Subcommittee on Irrigation and Reclamation,
Senate Office Building, Washington, D. C.:

Mountaineers representing 3,000 members in Northwest request that you include in the records our opposition to S. 500 or any bill providing for the Echo Park Dam in Dinosaur National Monument. Wilderness has priority over all other values in our primitive national parks and monuments.

THE MOUNTAINEERS,
CHESTER L. POWELL,
President, Post Office Box 122.

THE AMERICAN MUSEUM OF NATURAL HISTORY,
New York 24, N. Y., February 24, 1955.

Senator CLINTON P. ANDERSON,
Chairman, Senate Subcommittee on Irrigation and Reclamation,
Senate Committee on Interior and Insular Affairs,
Washington 25, D. C.

DEAR SENATOR ANDERSON: I will be unable to attend the hearings that the subcommittee have scheduled for February 28 on S. 500 relative to the upper Colorado project. However, I would like to go on record as urging that the Echo Park Dam be eliminated from the project at this time. We are greatly concerned over the preservation of the integrity of our national park system and it seems to me that the inclusion of this particular dam in the project violates the basic principle that must be maintained if over the years ahead our parks are to be preserved.

I happen to be an engineer by training and it is my feeling that the Bureau of Reclamation have not adequately restudied the project on the basis of omitting the Echo Park Dam. My own experience tells me that if nature just hadn't happened to create the canyons of the Green or Yampa Rivers, a group of smart engineers could still have figured out a storage project for the upper Colorado River and I have yet to be convinced that a project eliminating Echo Park Dam would not be almost, if not entirely, as feasible as the project you now have under consideration. Even if after a restudy the project with Echo Park Dam in it proved to be somewhat more feasible from an economic standpoint, I would still be against it as I think the principle of the integrity of the national parks is something for the American people that is well worth spending money to preserve.

Sincerely,

RICHARD H. POUGH.

CARMICHAEL, CALIF., *March 1, 1955.*

Senator CLINTON P. ANDERSON,
Senate Office Building, Washington, D. C.:

California Wildlife Federation, representing 11 regional sportsmen councils of over 500 organizations, wish to advise you that they are opposed to the inclusion of Echo Park Dam in the upper Colorado reclamation project.

CALIFORNIA WILDLIFE FEDERATION.
GEO. D. DIFANI, *President.*

RESOLUTION

Whereas there have been introduced in the 1st session of the 84th Congress, bills for the authorization of the Colorado River storage project and participating projects—upper Colorado River Basin (project planning report 4–82.81.1), and there will probably be introduced bills for the authorization of the Frying Pan-Arkansas diversion project—Colorado, project planning report 7–82.49.1); and

Whereas the first of these projects is one for the regulation of flow and control of supply of water of Colorado River in the upper basin, in its entirety for the improving and increasing of the total usable amount of water in the upper basin of Colorado River; and

Whereas the second of these projects is for the diversion of water from the natural basin of Colorado River to that of Arkansas River, and consequently will result in the diminution of the total in-basin supply of Colorado River water, to the prejudice of uses within the natural basin: Now, therefore, be it

Resolved by the board of directors of the Colorado River Water Conservation District, That it earnestly calls upon Colorado Senators and Representatives in the 84th Congress to use every means within their power to assure and insure that the Colorado River storage project shall be authorized prior to, and take precedence over and be constructed before, the Frying Pan-Arkansas diversion project in order that the supply of water within the natural basin shall be conserved for uses within that basin and not be unduly diminished by the prior authorization or building of the Frying Pan-Arkansas diversion project; and be it further

Resolved, That this resolution be sent to Senators and Representatives from Colorado in the 84th Congress; to the Honorable James E. Murray, chairman, Interior and Insular Affairs Committee, United States Senate; to the Honorable Clinton P. Anderson, chairman, Subcommittee on Irrigation and Reclamation, United States Senate; to the Honorable Clair Engle, chairman, Interior and Insular Affairs Committee, House of Representatives; to the Honorable Wayne N. Aspinall, chairman, Subcommittee on Irrigation and Reclamation, House of Representatives; to the Honorable Douglas McKay, Secretary of the Interior Department; and to the Honorable Edwin C. Johnson, Governor of Colorado.

STATE OF COLORADO,
County of Garfield, ss:

I, F. C. Merriell, secretary to the board of directors of the Colorado River Water Conservation District, do hereby certify that the above and foregoing resolution was adopted by them at meeting held in Grand Junction, Colo., November 6, 1954, and that the foregoing is a true, full, and correct copy of the resolution as so adopted.

Subscribed this 25th day of January A. D. 1955.

[SEAL] F. C. MERRIELL,
Secretary to the Board of Directors of the Colorado River Water Conservation District.

CHAMBER OF COMMERCE,
Eagle, Colo., February 15, 1955.

RESOLUTION

Be it hereby resolved, That this organization is on record in firm support of enactment of legislation to authorize the Colorado River storage project, which provides for development of the upper Colorado River Basin. We urge the Congress to approve this legislation, because of the great economic benefits it will provide for the States of Colorado, New Mexico, Utah, and Wyoming, and for the Nation as a whole. We endorse this project because it will aid national defense, help the Navaho Indian Tribe, lengthen the life of Hoover Dam, provide water and power for a growing West, and yield countless other benefits.

Be it resolved further, That we as members of this organization do take it upon ourselves to become acquainted with the project and what it means, and that we ask our friends in other States to write their Congressmen in support of the Colorado River storage project.

Be it resolved, That Congressmen from our respective areas be informed at once of this resolution and of this action today.

This resolution is adopted unanimously because the Colorado River storage project is in the best interests of all the citizens of this great Nation.

A. B. KOONCE, *President.*

MARSHALLTOWN, IOWA, *February 28, 1955.*

CHAIRMAN,
Senate Committee on Interior and Insular Affairs,
Senate Office Building, Washington, D. C.:

Conservation and nature groups throughout country would appreciate defeat of bill S. 500 in present form. Irrigation water need is understandable, but Echo Park Dam in Dinosaur Monument should be excluded. General public does not want any national park or monument flooded. Please do all you can to preserve such areas in natural state and entirety.

Mr. and Mrs. EVERETT L. DIXSON.

FARMINGTON CHAMBER OF COMMERCE,
Farmington, N. Mex., February 24, 1955.

Hon. CLINTON P. ANDERSON,
Chairman, Subcommittee on Irrigation and Reclamation,
United States Senate, Washington, D. C.

DEAR SENATOR ANDERSON: Situated as we are on the San Juan River, we are in an excellent position to make a statement as to the deplorable waste of one of our most necessary and rapidly diminishing resources, namely, water.

Reports from various in-the-field officials are, no doubt, in the hands of your committee. Taking into consideration the mental turmoil of folks actually watching their resources rushing by must give cause for thought and deliberation.

One can well imagine the chagrin of destitude Navaho Indians who have watched this wasteful practice for the past 75 years, even though the Great White Father had promised them aid and assistance in becoming self-supporting, through the treaty of 1868.

So much has been said and written and reported on the upper Colorado River storage project, we feel no one involved in the passage of bill S. 500 will need further information. We merely wish to call the attention of your committee to the fact that the present situation, which should have been alleviated years and years ago, is contrary to conservation methods constantly stressed by the United States governmental agencies.

Realization of this project will undoubtedly be of immeasurable benefit to the country as a whole. We respectfully urge your committee's favorable report on this bill and every assistance possible in the assurance of its passage.

Very truly yours,

FARMINGTON CHAMBER OF COMMERCE,
By A. J. ZIMMERMAN, *Secretary.*

FLORIDA WILDLIFE FEDERATION,
COMMITTEE OF NATIONAL AFFAIRS,
St. Petersburg, Fla., February 12, 1955.

In re S. 500, Colorado storage project

Hon. CLINTON P. ANDERSON,
Chairman, Senate Committee on Interior and Insular Affairs,
Senate Office Building, Washington, D. C.

DEAR MR. ANDERSON: The Florida Wildlife Federation, in executive meeting February 6, 1955, voted unanimously to sustain their recommendations of last year concerning the above-captioned bill, such recommendations as follows:

RESOLUTION

Whereas the projects of the Bureau of Reclamation, and other Federal bureaus and agencies, designed for the conservation of America's water resources is an absolute necessity; and

Whereas the irrigation and reclamation project as outlined in Senate bill No. 500 contains many beneficial features for the conservation of water supply; and

Whereas there appears from the examination of the plans to be adequate facilities for such an irriagtion and reclamation project to conserve water without invading our national parks: Now therefore, be it

Resolved, That the Florida Wildlife Federation request of the subcommittee considering this bill, S. 500, on February 28, 1955, that they eliminate Echo Park from any construction plans for said Colorado River storage projects.

In witness whereof, the president, for the executive committee, herewith attests to the authority vested in the undersigned to transmit this resolution to the chairman of the subcommittee concerned with the disposition of S. 500.

FLORIDA WILDLIFE FEDERATION COMMITTEE ON NATIONAL AFFAIRS,
(Mrs.) HELEN SULLIVAN, *Chairman.*

Attest:

H. R. WILBER, M. D., *President.*

ILLINOIS AUDUBON SOCIETY,
CHICAGO NATURAL HISTORY MUSEUM,
Chicago, Ill., February 25, 1955.

Senator CLINTON ANDERSON,
Subcommittee on Irrigation and Reclamation,
Senate Office Building, Washington, D. C.

DEAR SIR: We should like to have the following statement entered into the record for hearings to place a dam at Echo Park in Dinosaur National Monument:

1. No dam has been authorized by Congress in a national park or monument in 40 years. None is needed now.

2. The case for a dam at Echo Park has never been proved. Over and over again, last year, the engineers for the Reclamation Bureau and the Interior Department officials had to revise their figures because of errors.

3. We agree with the Hoover Reorganization Commission that the Reclamation Bureau is often wasteful in handling of funds. We cast grave doubt on this billion-dollar project. It will probably end up costing far more.

4. We realize full well that the dinosaur bones are not endangered by any dam. We are concerned with the flooding of scenic canyons, thereby changing the character of the park.

5. A reservoir would not make it more attractive. People do not travel thousands of miles to visit another placid lake. Forty-five million people visited our national parks last year. They came to see glistening glaciers, majestic mountains, roaring rivers, wonderful waterfalls, and primitive landscapes. They did not come to see muddy, fluctuating lakes which we would then have at Echo Park. The West will gain far more by an enduring national park at Yampa Canyon than by a silt-flooded dam.

6. The dam proponents say that access to the park is impossible because of the sheer walls. This is not true. Access is easily possible to various areas such as Castle Park and Split Mountain Gorge. Trails and roads can make more areas available.

We urge you to act as United States Senators, not as mere spokesmen for local interests hungry for profit. The United States Congress has had a noble tradition in upholding our national parks. Don't let us down now.

Truly,

RAYMOND MOSTEK,
Conservation Chairman, IAS.

MICHIGAN UNITED CONSERVATION CLUBS,
Grand Rapids, Mich., February 23, 1955.

Hon. CLINTON P. ANDERSON,
Chairman, Subcommittee on Interior and Insular Affairs,
United States Senate, Washington, D. C.

DEAR MR. ANDERSON: We write you in regard to Senate bill S. 500.

This has to do with the construction of Echo Park Dam.

This organization with a membership of 59,576 consisting of 284 affiliated clubs went on record at our annual convention unanimously opposed to the building of Echo Park Dam.

Members of the Michigan delegation and chairmen of committees last year were notified of this also. Our board of directors has recently gone on record again to reaffirm the position of the organization taken last year at annual convention.

We therefore notify you of our opposition.

Sincerely yours,

HARRY R. GAINES, *Secretary-Manager.*

NORTHWEST DIVISION OF THE
PENNSYLVANIA FEDERATION OF SPORTSMEN'S CLUBS,
Sharon, Pa., February 19, 1955.

Hon. CLINTON P. ANDERSON,
Chairman, Senate Subcommittee on Irrigation and Reclamation,
Senate Office Building, Washington, D. C.

MY DEAR SENATOR: The northwest division of the Pennsylvania Federation of Sportsmen's Clubs, representing nearly 27,000 organized sportsmen of northwestern Pennsylvania wishes you to know that they have again reaffirmed their stand of "no invasion of our national-park system, national monuments, and national forests." We ask for the preservation of these areas for all time.

We have been and still are opposed to any legislation that would authorize the building of the proposed Echo Park Dam in the Dinosaur National Monument.

We are cognizant of the extreme importance of water in the Western States. We are sincerely interested in any sound water-development plan that can utilize available water without threatening our national parks, monuments, etc., established by law and publicly supported by our millions of people.

We ask you to join us and these millions of other outdoor American citizens interested in the preservation of a bit of primitive America by defeating Senate bill 500.

We ask that this letter be read into and made part of the record of the public hearing of which you will be chairman and be held on the 28th day of February.

Respectfully,

DR. ROBERT S. DOW, *President.*
C. PAUL BLAIR, *Secretary.*

NEW MEXICO ASSOCIATION ON INDIAN AFFAIRS, INC.,
Santa Fe, N. Mex., February 21, 1955.

Hon. CLINTON P. ANDERSON,
United States Senate, Washington, D. C.

DEAR SENATOR ANDERSON: This association, with members in various parts of the United States, has gone on record solidly supporting S. 500, which would authorize the Secretary of the Interior to construct, operate, and maintain the Colorado River storage project and participating projects.

At our annual meeting on January 30 last, a resolution in support of S. 500 was passed unanimously. We are particularly interested in the Navaho Dam project, which would effect the rehabilitation of 15,000 people, one-fifth of the Navaho population. But it is necessary to think in terms of development of the entire basin.

We must plan for the future. There are nearly 80,000 Navahos now, and their reservation is inadequate to support them. This has been so for many years. Within 20 years, the Navaho population will be 150,000 at the present rate of increase. If provisions are not made to enable them to become self-supporting, then there will be a relief problem that not only will cost must more than the dam, but it will mean abject poverty, misery and degradation. This seems to be the time to start a point 4 program in our own country.

This is an arid land. Population increases make the problem of water shortage increasingly acute. From year to year it will become more so. It is good sense, good economics and sound planning to get the Colorado River storage project in operation.

In addition to these reasons, it goes without saying that this project should be the concern of those in charge of national defense; for in case of war, there will be a movement inland, away from the coastal areas and into the Rocky Mountain region. We must be prepared for such contingencies, and we hope the Congress will not delay its approval.

Sincerely,

CATHERINE FARRELLY, *President.*

TALL POPLARS,
Kitts, Ky., February 10, 1955.

Hon. CLINTON P. ANDERSON,
Senate Office Building, Washington 25, D. C.

DEAR SIR: It is my duty to present to you the views of the members of two organizations whom I represent, legislative chairman for the Kentucky Federation of Women's Clubs, 17,000 members, and conservation chairman for the Garden Club of Kentucky, 5,000 members. They are in conformity with resolutions passed by a majority vote of both clubs' national organizations. I enclose also a petition from my local club.

We respectfully urge that, and only that, Echo Park and Split Mountain Dams be either deleted from the Colorado storage project; or that the area of Dinosaur Monument to be inundated be withdrawn from the national park system. We are opposed to any impairment of natural features; dam building; commercial exploitation; over and uncontrolled grazing; in our national parks, monuments, and forests. We want such areas preserved for future generations and for the purpose for which they were set aside.

I regard as most unfortunate, and resent, Time Magazine's erroneous statements in their article on Echo Park, and the reflection cast upon our President by the explanation accompanying its publication in the Congressional Record.

Having read most of the testimony and facts brought out in the 903 pages of the hearings on the Colorado River project before last year's subcommittee, I feel that my and other conservationists' solicitude is not based on ignorance, prejudice, or lack of honesty. I realize the pressures of greed and expoilta-

tion. I see a pattern in our United States policies of seeming to conform to the mandates of the organizations of the United Nations. Please, let us not be a part of this one: "An enactment has been passed by the Economic Social Council of the U. N. which establishes the right to exploit property and resources". Let us not feel secure in our veto powers but remember that a two-thirds vote of the U. N. Assembly, or an elevation to treaty status can override any veto. Let us not follow Russia's example and dispose of our national parks.

Please, either withdraw the to-be-exploited area from the park system, or place these 2 of your 16 dams in some other of the 250 sites that Reclamation's engineers said were surveyed and suitable sites for the project.

Very sincerely,

EVANGELINE WHITFIELD.
Mrs. A. F. Whitfield, Jr.

HARLAN GARDEN CLUB FEDERATION

(62 members present)

"We, the undersigned, respectfully petition that Echo Park and Split Mountain Dams be deleted from the Colorado River project and not be constructed within the boundaries of Dinosaur National Monument. We are opposed to any impairment of natural features; dam building; commercial exploitation; over and uncontrolled grazing; in our national parks, national monuments, and national forests."

A PETITION FROM THE WOMEN'S CIVIC CLUB OF HARLAN, KY.

(65 members present)

"We, the undersigned, respectfully petition that Echo Park and Split Mountain Dams be deleted from the Colorado River project and not be constructed within the boundaries of Dinosaur National Monument We are opposed to any impairment of natural features; dam building; commercial exploitation; over and uncontrolled grazing; in our national parks; national monuments; and national forests."

IZAAK WALTON LEAGUE OF AMERICA, INC.,
IKETTES CHAPTER,
Anaheim, Calif., February 16, 1955.

Re bill S. 500

Senator CLINTON P. ANDERSON,
Chairman, Senate Subcommittee on Irrigation and Reclamation,
Senate Office Building, Washington, D. C.

DEAR SENATOR ANDERSON: It is our understanding that hearings on the Echo Dam project start February 28, 1955.

Our entire membership wish to go on record as protesting the placement of dams in national parks and national monuments when other sites are available.

Please keep our national parks and national monuments in their natural state, so that future generations may enjoy them as the Lord intended.

Yours very truly,

ANAHEIM IKETTES,
Mrs. EMMA J. LAWRENCE,
Corresponding Secretary.

CURTIS & TOMPKINS, LTD.,
San Francisco, March 7, 1955.

Re bills H. R. 270, H. R. 2836, and S. 500

CHAIRMAN OF THE SENATE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS,
Washington 25, D. C.

DEAR SIR: We the undersigned are very strongly opposed to the inclusion of Echo Park Dam in any part of the upper Colorado River storage project. Were there no alternative possibilities for attaining the same end (which in this case there are), there might be a better reason for depriving present and future generations of this great scenic area.

With our expanding population, there are now not enough unspoiled recreational areas to accommodate the people. Many of our national parks become

so overcrowded they are often a source of complaint. More parks and monuments should be made available to the public (not less) which is sadly in need of that kind of mental uplift and inspiration.

Needlessly to commercialize or destroy these natural beauty spots is something that should be strongly opposed unless there are no substitutes available to meet the country's physical needs, which in this instance is not the case. Those of us who have been fortunate enough to view the grandeur of this area which Echo Park Dam would cover feel that all other locations should be utilized before destroying this superb canyon country.

We hope you will give the matter your very serious consideration and view the subject not alone on a commercial basis, but also on the higher level of preserving for our people the benefits to be gained by contacts with such inspiring surroundings as those which the dam, if built, would destroy.

We hope to learn that you are behind the constructive side of conservation and are actively opposed to those who wish to invade the public domain.

Looking forward to receiving your views on the subject, we are

Respectfully yours,

P. W. TOMPKINS and 8 others.

YAMPA VALLEY DEVELOPMENT ASSOCIATION, INC.,
Steamboat Springs, Colo., March 12, 1955.

Hon. JAMES E. MURRAY,
United States Senate, Washington, D. C.

DEAR SENATOR MURRAY: Our association has spent a large amount of time investigating the upper Colorado River project, and we are convinced that it will be beneficial for the entire country. We have also held a number of meetings in the Yampa Valley, and have been directed by the represented towns to do everything possible to further the cause of the bill.

We wish to point out the fact that various conservation arguments have little validity. There is no good reason why an area should be preserved in a condition under which no one is able to derive benefit. We, in the Yampa Valley, have had the opportunity to take the boat trip down the Yampa and Green Rivers, and we know that the Echo Park Dam will not diminish the scenic value of the area.

There are many important aspects of the project; including water storage, irrigation, and power. However, we are limiting our letter to the conservation aspect because this is the point on which we have firsthand information.

We urge you to act for the passage of the bill as presented.

Please call on our association if we can be of assistance to you in any way.

Very truly yours,

GATES GOODING, *Secretary.*

SALEM, OREG., *March 5, 1955.*

Hon. CLINTON P. ANDERSON,
Chairman, Subcommittee on Irrigation and Reclamation,
Senate Office Building, Washington, D. C.

DEAR SIR: The Chemeketans of Salem, Oreg., a mountaineering club of over 100 members, want this letter entered into the record of the hearing on the Dinosaur National Monument and Colorado River storage project (S. 500).

We have made a careful study of the question involved. Some of us have visited the monument, and many of us have seen colored motion pictures taken on boat trips down the Yampa and Green Canyons.

We protest the building of any dams within the monument because—

1. The Interior Department's plans for the upper Colorado River project involve the expenditure of hundreds of millions of dollars in total. A searching study of the entire project should be made by impartial engineers and this study should be published for all to read. Testimony at the hearings last year clearly demonstrated that the Interior Department's engineers are highly inaccurate in their conception of water evaporation in the various possible dams; they very likely are, upon careful study, off on other items of fact too.

2. We have written the Secretary of Interior and to others but have not received a satisfactory answer as to just where the industry and the population is that would use the water stored by 27 dams. Will you please see that we get an answer to this all-important question?

3. We object to the principle that anytime someone gets the idea that dams be built within national parks or monuments that Congress will take these requests seriously. With a growing population having more time for recreation, and in an increasing population there will be more frustrations and a greater need for recreation, the few remaining beauty spots should be treasured for the present and future spiritual and recreation needs of everyone. It would be most unfortunate to ever give our greatest pieces of heritage—areas of great natural beauty—away to a relatively few who want to make money on them.

4. We know very well that the original 80 acres from which the dinosaur bones would be taken will not be inundated.

Very sincerely yours,

A. WESTON NIEMELA,
Chairman, Chemeketan Conservation Committee.

THE WATER DEVELOPMENT ASSOCIATION OF SOUTHEASTERN COLORADO,
Pueblo, Colo.

RESOLUTION

Whereas the Water Development Association of Southeastern Colorado has, since its inception in 1943, promoted as of prime interest the approval and authorization of the Fryingpan-Arkansas transmountain water diversion project, which project when approved will export a very small amount of surplus water from the upper Colorado River Basin;

Whereas the Water Development Association of Southeastern Colorado has considered the desirability of and the acute need for the authorization of the Colorado River storage project and participating projects;

Whereas the Water Development Association of Southeastern Colorado believes that the first stage of said Colorado River storage project and participating projects, now proposed for authorization, is sound in all respects;

Whereas the Water Development Association of Southeastern Colorado realizes that the holdover storage that would be provided by the Colorado River storage project and participating projects is essential, if the upper basin States of Arizona, Colorado, New Mexico, Utah, and Wyoming are to be in position to make the full consumptive use apportioned to them as a group by the Colorado River compact of 1922 and by the upper Colorado Basin compact of 1948: Now, therefore, be it and it is hereby

Resolved by the board of directors of the Water Development Association of Southeastern Colorado,

(1) That the Water Development Association of Southeastern Colorado approves of and urges the prompt authorization of the Colorado River storage project and participating projects, as recommended by the Upper Colorado River Commission.

(2) That the officers of the Water Development Association of Southeastern Colorado be, and they are hereby, requested to cooperate in all suitable and practicable ways, with the Upper Colorado River Commission, its officers, its staff, and its committees in securing the authorization of the said Colorado River storage project and participating projects.

(3) That copies of this resolution be supplied to Senator Clinton P. Anderson and Congressman Wayne N. Aspinall.

Done at Pueblo, Colo., March 3, 1955, in regular meeting assembled.

[SEAL]
Attest:

CHARLES BOUSTEAD, *President.*

M. G. WILLIAMSON, *Secretary.*

EXECUTIVE OFFICE OF THE PRESIDENT,
BUREAU OF THE BUDGET,
Washington, D. C., March 17, 1955.

Hon. JAMES E. MURRAY,
Chairman, Committee on Interior and Insular Affairs,
United States Senate, Washington, D. C.

MY DEAR MR. CHAIRMAN: This will acknowledge Mr. Stewart French's letter of January 20, 1955, requesting the views of the Bureau of the Budget on S. 500, a bill to authorize the Secretary of the Interior to construct, operate, and main-

tain the Colorado River storage project and participating projects, and for other purposes.

Enactment of legislation authorizing the Colorado River storage project was recommended by the President both in his state of the Union message and his budget message this year. The views of this Bureau concerning the details of such legislation were expressed in letters of March 18, 1954, to your committee and to the Secretary of the Interior, which are printed in Senate Report No. 1983, 83d Congress, 2d session. On April 1, 1954, a draft bill, which was developed in collaboration with the Department of the Interior, was submitted to your committee.

With respect to the detailed provisions of S. 500, this Bureau has the following comments:

1. In the absence of new information justifying their inclusion at this time we have no basis for reappraising the merits of those projects heretofore considered and not recommended for authorization either by the Secretary of the Interior or the Bureau of the Budget. Similarly, in the absence of detailed planning reports for those projects not heretofore considered by the Bureau of the Budget, including data on engineering, financial, and economic feasibility, detailed estimates of costs and benefits, and sufficient other pertinent information necessary for a complete understanding of the justification and necessity for the work, there is no adequate basis for appraising the merits of such projects. For these reasons we believe that the authorizations for the Cross Mountain, Flaming Gorge, Curecanti, and Navaho units, and the Gooseberry, San Juan-Chama, and Navaho participating projects should be deferred until the necessary information justifying such action has been submitted to the Congress in accordance with established procedures.

2. There would appear to be ample justification for the closest cooperation between the Departments of Agriculture and Interior concerning the agricultural aspects of the participating projects. The use of the word "consultation" on page 3, line 25, would therefore be understood to mean consultation in its broadest sense.

3. Section 7 and reference to it in section 1 (2) (a) (iii) is interpreted to mean that all costs for improvements in fish and wildlife, as well as mitigation of losses not attributable to the construction of the project, shall be nonreimbursable and nonreturnable and shall be financed by the agencies responsible for these programs. However, the cost of preventing damages attributable to the construction of the project should be treated as a part of the cost and allocated to the various purposes in the same manner as other damages. The addition of clarifying language would avoid misinterpretations.

4. The inclusion of section 10 in our draft bill referred to above, namely, "Construction of the projects herein authorized shall proceed as rapidly as is consistent with budgetary requirements and the economic needs of the country," would appear to be a desirable addition to S. 500, since this would be the principal consideration in determining rate of construction and development.

5. It is considered that the authorization should be limited to $950 million, as proposed in the draft bill, in order to give the Congress a greater measure of control over the extent of the development and an opportunity to review the program from time to time.

6. Since we do not have detailed information concerning the city of Denver's proposed Blue River project or the effects of the provisions of section 11 of S. 500 on the interests of the Federal Government or on pending litigation, we are not in a position to comment on this section at this time, and have requested the Department of Justice to review this section.

7. The Bureau of the Budget also is not in a position to comment on section 12, until we have received the views of the Department of Justice on this section.

8. It is recommended that the title be amended to read, "To authorize the Secretary of the Interior to construct, operate, and maintain initial units of the Colorado River storage project and participating projects, and for other purposes."

Accordingly, it is recommended that S. 500 be amended as outlined above.

Sincerely yours,

(Signed) DONALD R. BELCHER,
Assistant Director.

RESOLUTION

Whereas the upper Colorado River storage project proposed for construction in Colorado and neighboring States would bring much-needed electric power to the farmers and ranchers of that area; and

Whereas only with such a system of storage and power dams will the waters of the Colorado River be impounded so that utmost use can be made of them; and

Whereas other benefits of such project would be reregulation of the present flow of the Colorado River, flood control, fish and wildlife development, improved recreational facilities, domestic, industrial, and irrigation water; and

Whereas there exists in the upper Colorado River Basin great natural resource potential which can only be developed by means of water storage and the electricity produced therefrom: Now, therefore, be it

Resolved, That we endorse the proposed upper Colorado River storage project, including Echo Park Dam and other dams with full traditional preference rights to rural electric cooperatives and municipal electric systems for purchase of electric power, together with transmission lines to take electric power from electric generation plants on said project to load centers of municipal systems and rural electric systems within reasonable transmission distance of said project, and with transmission interties to the Colorado-Big Thompson system and any other Federal systems.

I, Wayne Lunt, secretary of the La Plata Electric Association, Inc., do hereby certify that the above and foregoing is a true and correct copy of a resolution adopted by the board of directors of the La Plata Electric Association, Inc., at their regular meetting held in Durango, Colo., March 9, 1955.

WAYNE LUNT, *Secretary.*

RESOLUTION

Whereas the executive board of the Montezuma County Planning Association represents 48 organizations of Montezuma County realizes the need for water to promote the future development of this area and the upper Colorado River Basin, do on this the 23d day of February 1955, hereby recommend the passage of the bill for the upper Colorado River storage projects.

I. W. PATTERSON, *Chairman.*
FRED A. FITZSIMMONS, *Secretary.*

RISLEY JUNIOR HIGH,
Pueblo, Colo., March 7, 1955.

DEAR SENATOR MILLIKIN: We are one of the seventh-grade classes in Risley Junior High School.

We have been studying and talking about the Fryingpan-Arkansas project and why it is so important to the Arkansas Valley. The need for irrigation, water to drink, and for electricity is important, not only now, but for the years to come.

We think the persons or groups of people who do not want the bill to be passed in Congress are very selfish. Our class realizes that this is a loan which will be paid back, except for a small amount, in the next 50 years. We would be happy to help pay back the loan as consumers of the much-needed water.

So would you please do your very best to get the bill passed?

Respectfully yours,

THE 7-S CLASS
(Signed by 26 students).

[News from CIO]

CIO VOICES SUPPORT FOR CONSTRUCTION OF ECHO PARK DAM IN COLORADO

For immediate release, Tuesday, March 22, 1955

(The following statement is also being released in Denver, Colo.)

CIO support for the construction of the Echo Park Dam in Echo Park, Colo., as part of the upper Colorado River storage project, has been voted by the CIO committee on power, atomic energy, and resources development, it was announced today by Chairman O. A. Knight.

Mr. Knight, who heads the CIO Oil, Chemical, and Atomic Workers International Union, said the decision followed an extensive meeting of the committee in Denver late last month.

In reversing its previous stand of opposition to the dam, Mr. Knight said the committee now supports the dam project as a means of securing maximum benefits of water for irrigation and municipal purposes, as well as the development of electric power for expansion of the upper Colorado Basin area.

Mr. Knight's statement:

"From a careful study of the facts which have been presented to me and my committee, I am persuaded that the maximum benefit to mankind will result from the earliest possible completion of the upper Colorado storage project including Echo Park Dam. The engineering prospects provide facilities for recreation for those now interested in the scenery and wildlife aspects of this area, as well as substantial regulation of the waterflow in the river and a head of water for the production of electric power. This power is needed for the expanding population and industrial growth in the Mountain States. Salt Lake City, Utah, and Denver, Colo., and the total area between these two growing cities will greatly benefit from the earliest possible development of the total upper Colorado storage project."

(Whereupon, at 3:30 p. m., the committee was recessed subject to call.)

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